NAMAs and the Carbon Market

Nationally Appropriate Mitigation Actions of developing countries

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EDITORIAL

The role of carbon markets in scaling up mitigation actions in developing countries in the post-2012 climate regime is the topic of Perspectives 2009: *NAMAs and the Carbon Market - Nationally Appropriate Mitigation Actions of Developing Countries*. The eight papers presented explore how mitigation actions in developing countries, in the context of sustainable development, may be supported by technology, finance and capacity development in a measurable, reportable and verifiable manner. Key issues discussed are the pros and cons of market and non-market mechanisms in raising private and public finance, and the appropriate governance structures at the international and national levels. The aim of this publication is to present possible answers to these questions, with a specific focus on the role of existing and emerging carbon markets to finance NAMAs.

Since 2005, when the Kyoto Protocol entered into force, the Clean Development Mechanism (CDM) has involved developing countries in the creation of a global carbon market. As of October 2009 there were about 5000 projects in the pipeline, which were projected to generate a total issuance of 1.2 billion tonnes of Certified Emission Reductions (CERs) by 2012. In 2008, the issuance of carbon credits from CDM reached a volume of 138 million CERs, representing a value of about 2 billion USD at an assumed price of 15USD/tCO2. This is up from 74 million CERs and about 1 billion USD in 2007 (www.cdmpipeline.org). Compared to public finance raised for climate change in developing countries, mainly through the Global Environmental Facility (GEF) serving as the financial mechanism to both the Convention and the Protocol, countries received only about 1 billion USD over a four-year period from 2007-10 through these channels. As such, the carbon market has made a considerable contribution to mitigating climate change in developing countries. In addition, the CDM has created human capacity and institutional infrastructure in more than eighty developing countries that are hosting projects. These results constitute the success of the CDM, which is considered to be one of the most innovative elements of the Kyoto Protocol.

Challenged by its success, however, the CDM has encountered a number of weaknesses, including concerns about environmental integrity, technology transfer, its unequal geographical distri-

bution of projects, complex governance procedures and questions about its contribution to sustainable development. Solutions to these weaknesses were discussed in last year's Perspectives 2008: *How to reform the CDM in a post-2012 climate regime* (available at www.cd4cdm.org). Realising that the CDM needs to be improved and possibly complemented by new mechanisms for low-carbon development, the challenge ahead is how to create the right incentives to significantly up-scale mitigation actions in developing countries. To avoid dangerous warming above 2˚ C from pre-industrial levels, setting developed country targets in line with science would send the right market signal to stimulate enhanced cooperation with developing countries.

In the context of the negotiations for an agreed outcome at Copenhagen in December 2009, the issue of NAMAs is being discussed in the Convention track for Long-term Cooperative Actions (AWG-LCA). Under this track a NAMA crediting mechanism has been proposed to increase emission reductions either under the existing governance structure or under a new structure to be supervised by the Conference of the Parties (COP). Further, in 2007 the Bali Action Plan (BAP) defined a structure for the negotiations, which clearly distinguishes the nature and legal status of enhanced action on mitigation by developed countries in paragraph 1 (b) (i) on quantified emission limitation and reduction objectives (QELROs) from that of developing countries in paragraph 1 (b) (ii) on nationally appropriate mitigation actions (NAMAs). This distinction, however, has since been challenged, though with little success, by some developed countries making new proposals for general mitigation actions by *all* Parties based on national circumstances rather than Annex-1 or non-Annex 1 status.

In this context, some of the key questions to be addressed are how to agree on aggregate developed-country emission-reduction targets and substantial deviation from Business as Usual (BAU) in developing countries in line with science scenarios to stay below 2˚C warming. Bottom-up approaches based on national circumstances and national laws specific to all Parties have been proposed by a number of developed countries, while top-down approaches for internationally binding commitments are being proposed by other developed countries, as well as most developing countries. The question of how to differentiate the global emission-reduction burden among developed, developing and all Parties according to common but differentiated responsibilities is at the heart of the NAMAs negotiations. The aggregate emission-reduction targets, along with the rules of mechanisms for how to achieve these, eventually decide the demand for carbon credits. Market-based, offset mechanisms are typically favoured by developed countries, as they offer a cost-effective means to achieve targets. However, a major flaw of existing offset mechanisms is that they do not contribute to overall global emission reductions. Hence, many developing countries argue for domestic emission reductions and favour public sources of finance and non-market based mechanisms. How to achieve the right balance between market and non-market mechanisms in order to leverage both private and public finance for NAMAs is a key question that needs answering.

Providing answers to these questions is far from simple. Eight authors each contribute with their own perspectives as negotiators from developing countries, Designated National Authorities, business and researchers. They address two overall issues:

Policy based NAMAs

- With a Chinese perspective on how NAMAs could to be defined and categorised, *Teng* explains how NAMAs may be measured, reported and verified in a differentiated manner according to different types of actions and how finance may be raised for their implementation. The paper concludes that two preconditions exist to up-scale mitigation actions by developing countries: 1) adequate up-front financing; and 2) an effective mechanism to reduce risk in case of a failure to obtain support after implementation. The current carbon market cannot meet any of these preconditions.

- As a lead negotiator on behalf of developing countries in the G77+ China group, *Muller* offers her personal perspective on the role of NAMAs under the Bali Action Plan. The paper does not represent a particular national perspective, though Muller comes from the Philippines. The paper demonstrates that NAMAs will happen on a voluntary basis only, as there are no obligations in the Convention for developing countries to do so. Furthermore, it is shown that there is no need for any new mechanisms outside the UNFCCC to govern NAMAs. Rather, existing mechanisms under the Convention may be further elaborated so as to undertake NAMAs.

- From a southern African perspective, *Zhakata* from Zimbabwe considers how NAMAs may be designed so as to work for the benefit of African countries. Existing market mechanisms for carbon trading, particularly the Clean Development Mechanism, are found to have largely bypassed African countries. Yet, the paper argues that, in a future climate regime post-2012, market mechanisms could be designed so as to improve the commercial viability of mitigation investments, which also holds out a promising means to leverage private finance and technology for African countries in moving towards their clean development.

- Focusing on the trust-building role of NAMAs, *Zevallos* from Peru explores the role of NAMAs from three perspectives: 1) global mitigation and the ongoing negotiations; 2) the achievement of sustainable development at the national level; and 3) synergies between mitigation and adaptation. The paper finds that trust has been lost among nations in the ongoing climate negotiations. In order to facilitate an ambitious agreement in Copenhagen 2009, trust needs to be restored and NAMAs can play a key role in this trust-building process.'

Sectoral NAMAs

- Exploring the technical feasibility of a Sector No-lose Target (SNLT) in the transport sector in China, *Ellermann,* who is employed by Ecofys in Germany, presents a case study of the sub-sector of urban transport in Beijing to road-test the SNLT template. The paper finds that this kind of sectoral approach could work as a NAMA in China.

- A new approach for a NAMA framework is presented by *Cheng* and *Zhu,* who are employed as researchers at the UNEP Risø Centre in Denmark. The building sector is used as an example to illustrate how NAMA measures such as energy efficiency standards, training, certification and awareness-raising can be registered based on national specific circumstances. The paper points out how this new framework may unlock the enormous potential for low-cost emission reductions in the dispersed energy end-use sectors in developing countries.

- Coming from business, *Marcu* offers a visionary perspective on how a global carbon market can develop in a post-2012 regime. Through the gradual linking of existing domestic and regional cap and trade schemes – including future cap and trade schemes in developing countries for sectors – a global price on carbon can be achieved for the post-2020 era.

In a broader perspective NAMAs in developing countries offer the opportunity to change unsustainable development paths towards the vision of a Green Economy. Led by the United Nations Environmental Program (UNEP), the objective of the Green Economy Initiative (www.unep.org/greeneconomy) is to motivate governments and business to significantly increase investment in low-carbon development and the environment as an engine for economic recovery, decent job creation and poverty reduction in the 21st century. Supporting this initiative, UNEP and the UNEP Risø Centre (*www.uneprisoe.org*) play leading roles in CDM analytical development and capacity-building and are well positioned to support the development and implementation of mitigation actions such as NAMAs.

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The UNEP Risø Centre
Energy and Carbon Finance Group

The Energy and Carbon Finance Program of the UNEP Risø Centre (URC) supports the implementation of UNEP's activities related to the promotion of low-carbon development goals, including the use of carbon finance and CDM to promote renewable energy and energy efficiency in developing countries. URC core activities include CDM capacity building in developing countries. The Program consists of 15 staff coordinated by Miriam Hinostroza. Contacts: kaol@risoe.dtu.dk, jqfe@risoe.dtu.dk, milh@risoe.dtu.dk


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NATIONALLY APPROPRIATE MITIGATION ACTIONS:

China's Experience and Perspective

Abstract:
This paper seeks to facilitate multilateral understanding of Nationally Appropriate Mitigation Actions (NAMAs) and Measurement, Reporting and Verification (MRV) as important aspects of the Bali Action Plan (BAP). NAMAs and MRV have become keen issues of debate in international negotiations. This paper therefore considers different opinions and provides a perspective from the Chinese side covering several major design elements of NAMAs and MRV: the definition and scope of NAMAs, frameworks of measurement, reporting and verification of action and support, a channel to provide finance resources and institutional arrangements to facilitate NAMAs.

The Bali Action Plan (UN, 2007) calls for nationally appropriate mitigation actions (NAMAs) to be taken by developing countries, which will be supported and enabled by the provision of support from developed countries in terms of technology transfer, finance and capacity-building. Both actions and supports should be subject to the requirement to be measurable, reportable and verifiable. Half of 200 pages of negotiating text under long-term cooperative action (LCA) is dedicated to mitigation, mostly for NAMAs or so-called 1b(ii) in BAP.

With Copenhagen approaching, there are still quite different views among parties on the scope and definition of NAMAs, means of implementation and ways to measure, report and verify actions, together with institutional arrangements for providing support and revealing outcomes. Current debate about NAMAs reflects different understandings on NAMAs, especially the requirement for MRV (Ellis and Larson, 2008; Farson et al., 2009; Winkler, 2008). This paper aims to explain how NAMAs and MRV are un-

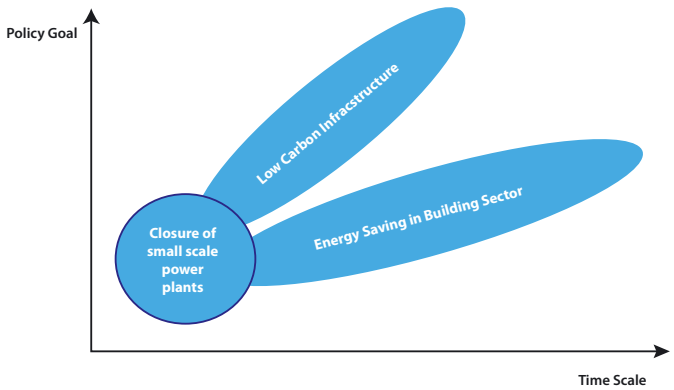
derstood from the point of view of a developing country and how they contribute to solving the dilemma over NAMAs.

This paper begins with a brief introduction to the practice of mitigation actions in China and describes the many lessons learnt from these practices. The second section aims to highlight the debates over the scope and definition of NAMAs, debates that are sometimes due to different understandings of MRV. The third section begins with comparison of different MRV systems under the Kyoto Protocol and Clean Development Mechanism and is followed by an in-depth discussion of the MRV system, including its scope and context. The fourth and fifth sections discuss the linkage between NAMAs and carbon markets and institutional issues related to the implementation of the NAMA cycle. The last section concludes this paper.

Mitigation Actions in China: Practice and Experience

The best way to consider mitigation actions in developing countries is to survey existing practice and provide corresponding support to enhance its implementation in terms of scale, scope and intensity. Some developing countries such as China have adopted mitigation actions by using domestic resources to control their GHG emissions and contribute to global efforts to cope with climate change.

Figure 1. Diversity of mitigation actions in terms of time scale and policy goals



The review of existing practice in China (Teng et al., 2009) confirms the following conclusions. Firstly, most current actions are self-funded mitigation actions within the context of sustainable development. These mitigation actions differ significantly as a result of varying circumstances and policy tools. For example, mitigation actions in the building sector are mainly based on energy codes and regulations, while those in renewable energy mainly focus on development goals and preferable tax policies. There is no one-fit-all solution for mitigation actions. Mitigation actions taken by developing countries should reflect the specific development priority of each country.

Secondly, not all mitigation actions will result in direct or quantifiable emission reductions. For example, it is difficult to quantify mitigation benefit from an energy efficiency R&D program. Some mitigation actions have limited emission reduction potential in the short term but have an overarching impact on the long-term emission path, e.g. urban planning and mass transit programmes in large cities (See Fig. 1). Mitigation actions should not only focus on those actions that have quantifiable and immediate mitigation benefits, but also should place greater emphasis on those with slow but increasing mitigation benefits, which are often invisible to current carbon markets.

Thirdly, a domestic statistics, monitoring and evaluation system has been established. Such

systems have similar ideas about the requirement to be measurable, reportable and verifiable and have been used to measure and assess the progress of energy intensity targets and energy saving in key enterprises. The evaluation system not only focuses on quantifiable outcomes, but also on other qualitative elements such as institutional arrangements, training and capacity-building.

Scope of NAMAs

The debate surrounding the definition of NAMAs has become a barrier blocking the negotiation process (McMachon,2009). Developing countries and developed countries have quite different understandings on this new term, which has been introduced by BAP.

Some proposals in the negotiating text suggest dividing NAMAs into the following three categories:

- Unilateral actions funded by domestic resources and without outside support
- Actions with support from developed countries; and
- Actions that could be credited and linked to the carbon market.

Most developing countries disagree with such definitions and categories of NAMAs, since they only count those actions with support from developed countries as NAMAs. They also discovered that a lot of self-funded unilateral mitigation actions (but not NAMAs) have been undertaken by developing countries and consider that these actions should be recognized by the international community but not be subject to MRV.

Most developing countries, including China, also think that emission reductions from NAMAs should not be used to offset quantified emission reduction limitation and objectives (QERLO). They regard emission reductions as a new contribution on the part of developing countries and NAMAs as different from existing offset mechanisms like the Clean Development Mechanism (CDM).

"Mitigation actions taken by developing countries should reflect the specific development priority of each country."

On the other hand, most developed countries agree with the wider definition of NAMAs and argue that unilateral actions are also NAMAs that should be subject to the requirement to be measurable, reportable and verifiable. They have also put forward several proposals to credit emission reductions from NAMAs and suggest using it as an offset mechanism to leverage the required finance.

The debate about the definition and scope of NAMAs is basically a debate about whether unilateral actions by developing countries should be measured, reported and verified *internationally*. Thus the central question of the debate over NAMAs is in fact not the definition of NAMAs but the definition of MRV.

Measurement, Reporting and Verification

There are three MRV requirements in BAP: MRV of the mitigation commitment of developed countries, MRV of the mitigation actions of developing countries, and MRV of the support

related to these actions. Most of the literature and discussion has focused on the second MRV, i.e. MRV of the mitigation actions of developing countries. The introduction of MRV can enhance confidence among parties to make sure that real actions have been undertaken and promised supports have been delivered. The idea of MRV can facilitate cooperative actions among developing countries and developed countries in a long-term view. Verification is at the centre of MRV not only because of its important role in building confidence, but also because it is a controversial concept among the parties.

An MRV system exists in national or regional carbon markets like the European Union Emission Trading Scheme (EU-ETS), in which the aim of the verification is to ensure a high level of assurance that the emission report is fairly stated and that the installation is in conformity with its GHG permit, monitoring methodology and other relevant requirement. Thus the emission report data are to be verified based on 5% materiality requirement and high assurance.

Verification is a very sensitive word in politics and has various understandings among the parties. One extreme may be the 'United Nations Monitoring, Verification and Inspection Commission (UNMOVIC)', which was created to check Iraq's compliance with its obligation not to reacquire weapons of mass destruction. UNMOVIC has the right to undertake unconditional and unrestricted inspections without any limitations. Such "verification" is, of course, not acceptable in the case of NAMAs in developing countries. A clear definition of "verifiable" is thus essential for the establishment of not only common understandings but also of MRV systems. Confidence should be built up, but with the condition that the sovereign rights of the host countries are respected.

The most important questions may include: What are the objects to be verified? What is the scope of verification? Who will undertake the verification process? Is the verification process is consistent with domestic laws and regulations to protect sovereign rights? During the negotiations, some

Table 1 Comparison of different MRV systems at the international level

	Emission reduction commitment of Annex B	**Clean Development Mechanism**
Measurement	National GHG Inventories	Project Design Document
Reporting	National communication, in-depth review report, report on demonstration of progress	PDD, validation report, verification report
Verification	Expert review of methodological issues	Before registration: validation report prepared by DOEs After registry: verification report prepared by DOEs

parties have suggested merging the discussion of MRV between 1b(i) and 1b(ii) and argued that they should be based on the same system. Before considering answers to these questions, it may be helpful to review the current system under the framework of MRV.

The comparison between the 'compliance procedures' of Annex I countries and the 'certification procedures' of CDM indicates that the design of the MRV system is determined by the objective of that system. The requirement of the MRV of CDM projects is much stronger than that of the commitment of Annex B countries simply because it is directly linked to the carbon market, which requires precise measurements of emission reductions. These two systems are different in various ways. Firstly, the 'compliance' procedure only measures emissions, not emission reductions. The inventory is an aggregate of emission sources by sector, not an aggregate of mitigation actions, and thus only an account of emissions. The PDD not only measures 'emissions' (including project emissions and baseline emissions) but also emission reductions which can contribute totally to the mitigation actions in the proposed projects. It can then ensure that every unit of emission reduction is due to mitigation efforts, not to economic recession or other natural variables. The most important difference between inventory and PDD is that the inventory only measures 'emissions' while PDD measure 'emission reductions'. Such differences are important because some proposals suggest using national inventory as a tool to measure 'emission reductions' from NAMAs. It is still not clear how the inventory could be used to measure 'emission reductions'.

Secondly, the 'verification' procedure for national communications of Annex I countries are in fact in-depth reviews made by an expert review team (ERT). The ERT assesses whether the communication followed the UNFCCC reporting guidelines, for example, whether the national communication contains all the parts required (completeness), whether the national communication has been submitted in timely fashion (timeliness), and whether the information contained in the national communication is clear and transparent (transparency). The verification process in CDM is more stringent than that in national communication. DOEs will not only verify the completeness and transparency of information related to projects, but also will 'audit' the original data sources and implementation of the monitoring plan. Thus the design and content of the MRV system is highly dependent on the objective of MRV. Thus, the MRV system for quantified emission limitation and reduction objectives (QELROs) by developed countries is quite different from the MRV system for NAMAs by developing countries with the support of developed countries.

"Verification is a very sensitive word in politics and has various understandings among the parties."

The MRV requirement is also not clear with respect to whether it should relate to international MRV or domestic MRV. For some developing countries, a domestic system has been established to fulfill the function of MRV. For example, China has established a national Monitoring, Assessment and Evaluation (MAE) system based on an enhanced energy statistics system. In 2008, an energy statistics department was established in the National Bureau of Statistics to enhance the function of the investigation, collection and analysis of energy statistics data, to carry

out inspections and assessments of the quality of energy statistics data, and to monitor energy consumption and production in key sectors and key enterprises.

But it is almost impossible to open the existing system to international entities. The Law of Statistics in China prescribes that 'Statistics institutions or statisticians that, in violation of the provisions of this Law, disclose … data or commercial secrets of an investigated unit or individual and thus cause losses shall bear civil liability'. The boundary of commercial secrets is not defined by the bureau of statistics but by enterprises. Most enterprises, especially energy-intensive industries, regard energy=related data as commercial secrets and ask the statistics institutions not disclose these data to third parties, not even to other governmental agencies.

Subject to domestic law, unilateral mitigation actions only can be MRVed by domestic agencies. In most cases, the domestic MRV system has a more stringent requirement than the international system.

The MRV requirement in BAP means MRV at the international level, which is only applicable to mitigation actions supported and enabled

".. most developed countries agree with the wider definition of NAMAs .."

through the provision of finance, technology and capacity-building by developed countries. The following discussion only refers to an international MRV system for NAMAs, that is, mitigation actions with support from developed countries.

The MRV system should aim at supporting sustainable development policies and measures in developing countries while contributing to the global effort to cope with climate change. To be successful, an MRV system must be attractive to both developing countries and developed countries. The main criteria for an MRV system should be credibility, cost-effectiveness, timeliness and a simple and clear procedure which gives enough flexibility for a wide range of mitigation actions.

What is being measured, reported and verified may be roughly categorized into three types:

- Type one: action and support is fairly stated, but emission reductions are difficult to estimate because of disagreements over methodology.
- Type two: emission reductions from supported action can be estimated but may be difficult or costly to measure precisely.
- Type three: emission reductions from supported action can be quantified and measured with a high degree of certainty in a cost-effective way.

One example of type one may include the adoption of an energy tax or carbon tax in developing countries. Although the mitigation benefit from such actions can be estimated theoretically, there is no consensus on the methodology because there are also other factors that affect fossil fuel consumption besides tax. But everyone agrees that the adoption of a fossil fuel tax can reduce fossil fuel consumption and related carbon emissions. An example of category two may be the promotion of energy-saving lamps in developing countries. A sampling method can be used to monitor the typical family and estimate the mitigation benefit from such promotion activity, but it will be costly

Table 2. Flexible design for MRV requirement for NAMAs

Confidence Level	Measurement	Reporting	Verification
High	Status of Actions Estimation of emission reduction	Progress report on actions Methodology and related data Data management and monitoring plan	Confirmation of actions Confirmation of related data source Confirmation of existence and implementation of data management and monitoring plan
Average	Status of Actions Estimate of emission reduction	Progress report on actions Methodology and related data	Confirmation of actions Confirmation of estimation methodology
Reasonable	Status of Actions	Progress report on actions	Confirmation of actions

to give a precise estimate if the sample is larger. A renewable energy development program is one example of category three. Once the goal of such a program is achieved, emission reductions can be more easily estimated based on existing CDM baseline methodology.

The output of verification should consider the flexibility of NAMAs and could confirm actions, the estimated range of emission reductions, and emission reduction with a high assurance level. The input for measurement and reporting may also be flexible, depending on the choice of the developing countries themselves. The following table lists three possible MRV requirements available to developing countries.

Developing countries could select different MRV requirements according to their concrete actions. The level of support could be differentiated among MRV requirements to give incentives for actions with higher levels of confidence regarding mitigation benefits.

The entity who receives the support directly will take responsibility for measuring and reporting the progress of action or other elements, while the verifier will verify the report and produce a verification statement based on its observations. The verifier could be third parties or an expert team authorized by the UNFCCC.

Measurement, reporting and verification for support are much easier than for action. The MRV of support could be undertaken together with the MRV of action. The same verifier could verify whether the promised support has been delivered in time and include some observations into the verification statement.

Regarding unilateral mitigation actions, developing countries could improve the transparency and credibility of their actions in a self-determined and appropriate way. National communication is an appropriate channel for the exchange of such information.

Public Finance Should Play a Leading Role to Enable and Support NAMAs

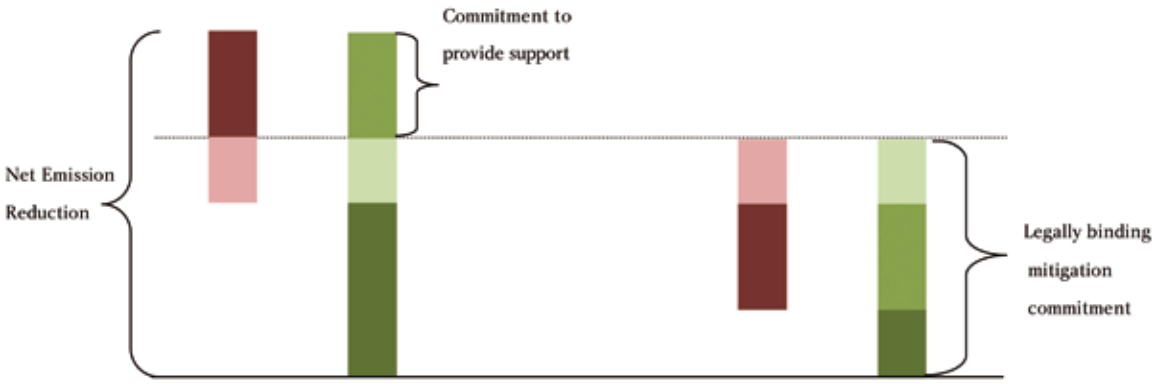
Another focus of debate is the relationship between NAMAs and carbon markets. Should emission reductions from NAMAs be credited? If so, how should these credits be used? Should NAMAs be used for an offset mechanism?

Before giving answers to these questions, it is better to review the existing regime because a new mechanism is only needed when there is a clear gap in the old mechanism. The question is, where is the gap?

One reason to link NAMAs with the international carbon market is to use the carbon market as a financial mechanism to provide the necessary financial support and positive incentives for developing countries.

Developing countries argue that emission reductions from NAMAs should not be used to replace or offset the reductions required by developed countries. These emission reductions should be regarded as a new net contribution from developing countries. The offset is a zero-sum game which cannot lead to new emission reductions. Some developing countries also argue that mitigation commitments and commitments to provide financial support by developed countries are two separate commitments (see Fig 2, dark green in fig 2 refer to domestic mitigation efforts in developed countries, light pink refer to exiting offset mechanism and dark pink refer to emission reduction from NAMAs). A new offset mechanism may lead to concerns about 'double counting' the commitments of developed countries. The introduction of a new offset mechanism will also weaken the mitigation efforts of developed countries and send negative signals to developing countries that mitigation efforts are costly. At the same time, the evolution of the current carbon market is only needed to meet expectations on the demand side, that is, the quantified emission reduction limitation and objectives. Given the presence of the less ambitious target of Annex I parties on the table, the introduction of NAMAs as an offset

Figure 2 NAMAs should go beyond offset mechanism



mechanism may also lead to the collapse of the carbon price and the loss of the finalizing function of the carbon market if demand and support are unbalanced.

The carbon market has shown its success in driving mitigation actions in a least-cost way, but it has also demonstrated disadvantage when it comes to providing robust and long-term price signals to mitigation actions in developing countries. A long-term carbon price signal is essential for long-term investment decisions in developing countries.

The major contribution of financial resources in enabling and supporting NAMAs should mainly come from public finance through a framework of international transfer payments from developed countries to developing countries. The developed country parties also could directly purchase international emission reduction credits as a way of balancing prices and going beyond offset mechanisms. It should be noted here that the market players are not the private sector but parties and governments. This idea corresponds to the idea of government demand in finance theory. Support to NAMAs should be delivered through an international transfer payment framework instead of only relying on the market. A developed party could commit itself to purchasing credits from NAMAs, and the payments will be contributed to the financial mechanism to secure the sustained financial resource.

The commitment by developed country parties to purchase credit from NAMAs can be used as an approach to generate part of the financial sources for support and to fulfill their commitments under the Convention. Such credit will not be used by the parties for compliance with their mitigation commitments. The price for these credits should be based on the idea of a 'safety valve' to ensure that there is a clear, long-term price signal for developing country parties to invest in low carbon infrastructures and secure the full incremental cost of these investments.

The new mechanism should go beyond the offsetting nature of the existing flexible mechanism and enhance the mitigation actions in developing countries through the provision of support in terms of finance, technology and capacity-building by developed countries. There is one thing that should be noted here, namely that there are diverse mitigation actions, only some of which can be quantified accurately and then credited. Those mitigation actions which are difficult to quantify in terms of their mitigation benefits are also important, as some of them have an overarching impact on the emission paths of developing countries, such as urban planning.

Institutional Arrangement

The main source of funding will be public finance from developed countries managed under a financial mechanism to provide support to developing countries' commitments under Article 4.1 of the Convention, including mitigation, adaptation, technology transfer, and development and capacity-building.

The mechanism will be operated under the authority and guidance of the Conference of Parties. The COP will establish a specialized fund for mitigation, which may be advised by a mitigation committee supported by a technical panel. The COP will decide on policies, priorities and eligibility criteria for funding to eligible mitigation actions. Once the mitigation fund begins work, developing country parties could submit their NAMAs with applications for support

to the mitigation committee. Such application reports may be prepared by the host country and include a description of the proposed NAMA, an action plan for implementation, an estimate of the mitigation benefit and emission reduction if possible and the support it would require, and a plan for MRV. The MRV plan could be flexible and different from case to case, but should be

"The main criteria for an MRV system should be credibility, cost-effectiveness, timeliness and a simple and clear procedure .."

transparent enough to ensure international confidence in these actions. Such a design will offer the flexibility of NAMA choice and also provide a sufficient incentive for developing parties to strengthen the MRV process.

The technical panel will review and assess the application and report their assessment of it back to the mitigation committee. Once the application has been approved by the mitigation committee, it will coordinate different 'funding windows' to provide agreed, up-front support to the host parties. After implementation, the NAMA and associated support will be registered in a registry operated under the mitigation committee with support from the Secretariat. Every year, the host country will prepare a progress report to assess the status of implementation of NAMA and its support. The host country will also invite a third party to verify its progress report and submit a verification report and verification statement to the mitigation committee. Once the progress report and verification report have been submitted, additional annual support will be given to the host parties to ensure the continuation of such actions.

The mitigation committee will summarize the implementation of all supported actions and issued support and report to the COP annually. The COP will adopt the report and adjust policies, priorities and eligibility criteria accordingly.

A coordinating body should be established in a host country to coordinate NAMAs within the host country. The coordinating body will be responsible for the submission of the application to the mitigation committee, the preparation of the progress report, the receipt of the support delivered and an invitation to the third party for verification.

Conclusion

NAMAs are mitigation actions undertaken by developing countries within the framework of sustainable development and contingent on the support of finance, technology and capacity-building support from developed countries.

Unilateral mitigation actions undertaken by developing countries with domestic resources also contribute greatly to the global effort to cope with climate change. Such actions should be recognized by the international community. Such voluntary actions are funded by the developing countries themselves, who should reserve the right to determine how to enhance the credibility and transparency of these ongoing unilateral mitigation efforts. The way for developing countries to gain recognition should be determined by themselves, depending on domestic law and national circumstances.

The NAMAs should go beyond being an offset mechanism, but this goal should not be achieved by shifting the burden on to developing countries, e.g. by setting an 'ambitious baseline'. These ap-

proaches will not only greatly underestimate the mitigation efforts made by developing countries, they are not incentive-compatible. The best way is not to use emission reductions from NAMAs to displace or offset mitigation commitment by developed countries.

The existing offset mechanism, like CDM, tries to measure emission reductions precisely. Thus only those mitigation actions with a clear boundary and less uncertainty about mitigation outcomes are feasible for CDM. The requirement for precise measurement also means higher transaction costs, which has became a barrier for small-scale mitigation actions. The NAMA should not repeat the procedure of CDM and abandon the requirement for the 'precise' measurement of emission reductions but shift to a simple and clear way to estimate mitigation benefits with some level of certainty. A flexible framework for NAMA is central to the whole cycle. A three-tier approach has been suggested in this paper to give enough flexibility for developing countries to use different types of NAMA as mitigation options. The MRV requirements should also be different for different NAMAs.

NAMAs should be supported in a holistic way, which can provide a continuous incentive for good practice. A financial mechanism with a sufficient and sustained finance resource is essential to achieve such goal. There are two preconditions for extending mitigation actions to a larger scale: adequate upfront provision before the implementation of action, and an effective mechanism to reduce the risk of failing to win support after the implementation. The current carbon market cannot meet these two preconditions. Thus, a mitigation fund or window under a financial mechanism will play a more important role in providing incentives for early actions. The financial resource can take the form of a voluntary contribution from developed countries in its early stages and will come from an international auction of some reserved emission permits from developed countries when trust has been built up among parties.

The extent to which developing countries will implement NAMAs will depend on the effective support provided by developed countries in terms of financial resources and transfers of technology. The most urgent thing to start NAMA is not an MRV system or a discussion on the definition of NAMAs but a support mechanism with ready support which can be used to start actions right now.

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MITIGATION ACTIONS OF DEVELOPING COUNTRIES:

*NAMAs under the Bali Action Plan**

Abstract

This paper demonstrates that, in accordance with the provisions of the Convention and relevant decisions taken by the Conference of the Parties (COP) to the Convention, Nationally Appropriate Mitigation Actions (NAMAs) by developing countries, as contained in paragraph 1 (b) (ii) of the BAP, are not obligations of developing countries under the Convention. Reporting on any mitigation or adaptation actions taken by developing countries is entirely voluntary. The paper further demonstrates that there is an obligation for developed country Parties to report on their commitments on the provision of financial resources, the facilitation and promotion of access to and transfer of technology, and meeting costs of adaptation,[1] and that this information is subject to review.[2] There are existing provisions under the Convention that cover the requirement for the measurement, reporting and verification (MRV) of the enabling means of support for the implementation of NAMAs. There are, however, no provisions for the obligatory MRV of NAMAs under the Convention. The provision of enabling means for the implementation of NAMAs by developing countries is an obligation of developed countries under the UNFCCC and cannot be done through the carbon markets.

* All the views expressed in this paper are the author's alone, based on her background knowledge of the Convention and the COP decisions, and there fore do not represent those of any country or groups of countries under the UNFCCC.

1 Article 12.3

2 Article 10.2 (b)

1. Introduction

1. 1 A contentious decision in Bali

The final plenary meeting of the 13th session of the Conference of the Parties in Bali, Indonesia, in December 2007 was marked by a series of dramatic incidents that underlined the lack of consensus on outstanding, contentious issues within the negotiations under the Bali Action Plan.

One of the most difficult issues for developing country Parties was the language in sub-paragraph 1 b (ii) of Decision 1/CP.13 of the Bali Action Plan. Negotiated in a small group that was closed to many high-level officials of developing countries, this particular paragraph prevented agreement on the draft decision during the last plenary meeting of the Group of 77 (a UN grouping of 132 developing countries) and China. Also, the draft text presented to the final plenary did not fully reflect the understanding of the developing country representatives who negotiated this paragraph.

Consensus within the G77 and China was only reached after intensive final consultations, when a substantive change was made and presented by India in the final plenary, placing the phrase 'in a measurable, reportable and verifiable manner' at the end instead of the beginning of the sub-paragraph. The addition of a comma in the final printed version of the decision, however, gave rise to conflicting interpretations of the paragraph, which then read as follows:

> *'1. (b) Enhanced national/international action on mitigation of climate change, including, inter alia, consideration of:*
>
> …
>
> *(ii) Nationally-appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner.'*

India also revised the heading in paragraph 1 (b) to put a slash between the words 'national' and 'international', in line with the commitments under Article 4.1 of the Convention, which are either one or the other, depending on the nature of the obligation referred to in that Article.

1.2 A long-standing issue

Mitigation actions by developing countries, in particular greenhouse gas (GHG) emissions reductions, are a long-standing issue underlying many of the negotiations under the UN Framework Convention on Climate Change (UNFCCC) since its adoption in 1992 and its entry into force in 1995.

In particular, negotiations on guidelines for national communications of non-Annex I Parties to the Convention, which include all developing country Parties, have been marked by intense discussions on how non-Annex I countries would reflect references to any activity relating to mitigation in these communications.

This contentious issue also arises in negotiations on the guidance to any operating entity or entities of the financial mechanism of the Convention, because of the direct linkage of the provision of financial resources to developing countries and the preparations of their national communications. These preparations are financed on an agreed full cost basis, while all other implementing measures subject to cooperative action covered by Article 4.1 are financed on an agreed full incremental cost basis, as provided for in Article 4.3 of the Convention.

Financing for all climate change activities under the Convention are currently channelled through an operating entity of the financial mechanism of the Convention, the Global Environment Facility (GEF). Voluntary financing for other climate change-related activities also can be channelled through institutions outside the framework of the financial mechanism of the Convention, such as bilateral, regional or multilateral institutions.

1.3 Consideration of developing countries' national communications

Developed countries have consistently taken the position that developing countries' national GHG inventories contained in non-Annex I communications are to be subject to review. This, however, is contrary to the provisions of the Convention and has just as consistently been rejected by developing countries. The inclusion of NAMAs in the BAP now provides a further opportunity for developed countries to insist on the measurement and verification of these inventories of emissions.

2. Nationally Appropriate Mitigation Actions (NAMAs)

2.1 Voluntary actions by developing country Parties

By definition, a NAMA can be determined by a country for itself alone. What is 'nationally appropriate' cannot be defined for one country by another, and particularly not by an international institution. Suggestions that internationally agreed assessments should be necessary to carry out a NAMA formulation, or asking whether NAMAs should be undertaken within the context of the sustainable development of each developing country, are entirely inconsistent with the provisions of the Convention.

There is likewise no obligation for developing countries to undertake mitigation actions under the Convention. The only national obligation for all Parties, including developing country Parties, on nationally formulated actions relate mainly to impact assessment and minimization of the adverse effects of mitigation and adaptation projects and measures.[3]

Financing for all climate change activities under the Convention are currently channelled through an operating entity of the financial mechanism of the Convention, the Global Environment Facility (GEF).

The sole provision in the Convention that could be possibly be interpreted to require mitigation actions on the part of developing country Parties to the Convention is Article 4.1 (b).

The heading of this Article refers to all Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances. These Parties are obliged to

> *'formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigation climate change by addressing anthropogenic emissions by sources and removals by sinks… and measures to facilitate adequate adaptation to climate change.'*

The obligation is therefore related to the preparation and publication of national communications

3 Article 4.1 (f)

including information on national programmes that contain measures to mitigate as well as to adapt to climate change, and their implementation. Taken together with the requirements for the contents of national communications, implementation still does not specifically refer to mitigation actions by developing countries.

By definition, a NAMA can be determined by a country for itself alone. What is 'nationally appropriate' cannot be defined for one country by another, and particularly not by an international institution.

2.2 Developed country Parties' mitigation commitments

In line with the principle of common but differentiated responsibilities permeating all of the articles of the Convention, Article 4.2 provides that developed country Parties *'commit themselves specifically'* to *'adopt national policies and take corresponding measures on the mitigation of climate change…'*[4] (underlining supplied)

The balance between the differentiated responsibilities provides the basis for the first element of the position of the Group of 77 and China on paragraph 1 (b) (ii) of the Bali Action Plan, namely that

> *'nationally-appropriate mitigation actions for developing country Parties…are distinct from the mitigation commitments of developed country Parties under its paragraph a (b) (i), both in magnitude and in legal nature.'*[5]

4 Article 4.2, heading, and sub-paragraph (a)

5 Doc. no. FCCC/AWGLCA/2009/INF.1, page 84, B, Proposal 1, x.2 , sub-paragraph (a).

3. Measurement, Reporting And Verification (MRV)

3.1 Only NAMAs that are supported and enabled in a measurable, reportable and verifiable manner can be in turn be subject to measurement, reporting and verification

There are no provisions or decisions related to assessments of the formulation of national programmes, and much less so for the actions that result from the implementation of the measures contained in these national programmes. It should also be understood that, while it would be possible for NAMAs that are supported and enabled to be measured, reported and verified, what are subject to MRV are the actions themselves, and not necessarily the results or effects of these actions.

There is therefore no comparison that can be made between the MRV of NAMAs and the certification of emission reduction units that is undertaken with project activities under the clean development mechanism (CDM) of the Kyoto Protocol, nor can similar verification activities be conducted for NAMAs.

3.2 MRV for enabling means and support for NAMAs

The only relevant provision for reporting that exists in the Convention is the obligation for developed country Parties to include *'details of measures taken in accordance with Article 4, paragraphs 3, 4 and 5'*[6], which deal, respectively, with the provision of new and additional resources, including the transfer of technology, meeting the costs of adaptation, and the promotion, facilitation and financing of the transfer of and access to environmentally sound technologies and know-how,

6 Article 12.3

particularly to developing country Parties.

In accordance with this obligation, guidelines for the national communications of developed country Parties contain specific provisions for reporting on the implementation of these obligations.[7]

In reporting on channels of such financing, Annex I Parties are called upon to distinguish clearly between the financing activities undertaken by the public sector and the private sector,[8] and also to distinguish between the information on funding provided through the Global Environment Facility (GEF), other institutions and bilateral agencies.[9]

What should therefore be established under the ongoing negotiations are modalities for reporting, verifying and measuring the implementation of developed country Parties of their commitments to provide financial resources, including those for transfers of technology, to promote and facilitate access to and transfer environmentally sound technologies, and to meet the costs of adaptation of particularly vulnerable countries, in accordance with Articles 4.3, 4.4 and 4.5 of the Convention.

It must be recalled that these obligations refer to enabling means for developing countries to undertake both adaptation and mitigation activities.

To ensure effectiveness and accountability, this mechanism for MRV of commitments by developed country Parties should be placed under the authority of the COP, through the Executive Board of the financial mechanism under the Convention, as proposed by the Group of 77 and China.

3.3 MRV for Enabled NAMAs

The Group of 77 and China have taken the position that only those NAMAs that are enabled and supported by measurable, reportable and verifiable financing, transfer of technology and capacity-building can be subject to any MRV procedure.[10]

Modalities for the measurement, reporting and verification of enabled and supported NAMAs are still to be defined through decisions to be taken by the COP.

3.4 Proposal on NAMAs from the European Community

The position taken by developing countries clearly contrasts with that of the European Community (EC) on the formulation of 'low-carbon development strategies and plans (LCDSs)' for developing countries, for the 'linking of MRV action with support in a MRV manner.'[11]

Furthermore, the EC proposes that LCDSs make a differentiation between those actions that can be financed domestically and those that would need support.

This proposal not only denies any commitment under the Convention for the provision of financial resources for enabling means for mitigation and adaptation actions in developing countries by reducing these means to mere 'support', it also suggests that developing countries could finance some of these actions themselves.

7 Decision 9/CP.2, Annex, paragraph 42, sub-paragraphs (a) to (e).

8 *Ibid.*, paragraph 43

9 *Ibid.*, paragraph 44

10 FCCC/AWGLCA/2009/IF.1, page 85, sub-paragraph (e)

11 FCCC/AWGLCA/2009/MISC.1/Add.4, pages 10 to 14.

Even worse, the proposal completely reverses the balance of differentiated responsibilities under the Convention, which states that the effective implementation of developing countries' commitments under the Convention will depend on the effective implementation of developed countries' commitments related to financial resources and transfers of technology.[12]

Taken together with the EC proposal for a long-term goal that would include emission reductions by developing countries, as well as purchases of emission reduction credits from them through the carbon market, this position is completely inconsistent with the UNFCCC and as such is proving to be a main stumbling block to any agreed outcome on NAMAs in Copenhagen.

3.5 Financing mitigation actions under the Convention

Mitigation actions covered by the measures under national or regional programmes are to be *financed separately* from the other implementing measures such as the formulation, publication and regular updating of these programmes, as agreed by Parties to the Convention in a decision taken at the first session of the Conference of the Parties in 1995.[13]

In its decision on the initial guidance to be given to any operating entity or entities regarding the financial mechanism of the Convention, the formulation by developing country Parties of nationally determined programmes to address climate change issues which are in accordance with national development priorities should be financed, including capacity-building and related activities.

Financing for the implementation of national programmes both for adaptation and mitigation adopted by developing country Parties could be provided upon request. In addition, financing should be provided for the agreed activities to mitigate climate change contained in the national programmes.[14]

It is therefore clear that what are financed under the Convention are the formulation, capacity-building and all other activities related to the formulation, management and regular updating of national programmes which are in accordance with national development priorities. Financing of the implementation of these programmes is provided *upon request*. In respect of this implementation, the agreed activities to mitigate climate change should also be supported.

Moreover, developing country Parties may, again on a voluntary basis, propose projects for financing, including the financing of technologies and practices needed to implement measures to address climate change, if possible together with estimates of all incremental costs, of the reductions of emissions and increments of removals of GHGs, and of any consequent benefits.[15]

Proposals suggesting that NAMAs should be subject to MRV, put in place or formulated before they can be enabled and supported by financing, technology and capacity-building are therefore in direct contravention of the provisions of the Convention.

Any listing or registry that would be established involving NAMAs that are supported and enabled in a MRV manner should be instituted through the financial mechanism of the Convention, but

12 Article 4.7

13 Decision 11/CP.1, paragraph 1 (b) on programme priorities, sub-paragraph (iv)

14 *Ibid.*, sub-paragraphs (v) and (vi)

15 Article 12.4

under the authority of the COP to ensure efficiency and accountability.

4. Enabling Developing Countries to Undertake Namas

4.1 Provisions for enabling NAMAs

In Article 4.1, the Convention clearly lays out areas for the promotion of international cooperation that would enable all Parties, in particular developing country Parties, to develop national programmes containing measures that could then be implemented as nationally determined policies and actions for mitigation and adaptation.

Foremost among the obligations of all Parties is the preparation of national communications with specific provisions for developed country Parties. The contents of these communications are specified separately for each Party and for developed country Parties.

It is evident that, without reliable information on inventories of GHG sources and sinks in any country, as well as assessments of vulnerabilities, it will not be possible to develop policies and measures to allow mitigation or adaptation actions to be undertaken. National communications are therefore the bases on which these policies and measures are developed at the national level.

The preparations of national communications for developing country Parties are provided with financial resources on an agreed full cost basis. The other activities are financed for developing country Parties on an agreed full incremental costs basis. These activities would enable developing countries to undertake mitigation actions and also adaptation actions.

The same provisions can be found in the Kyoto Protocol, which focus mainly on international cooperation for mitigation. Provisions in the Protocol include information to be provided by developing countries on '*the abatement of increases in GHG emissions, and enhancement of and removals by sinks, capacity-building and adaptation measures.*'[16]

There is likewise no obligation for developing countries to undertake mitigation actions under the Convention.

Financing for these activities is provided for in Article 11 of the Kyoto Protocol. Together with Article 12 of the Protocol, which deals with the clean development mechanism (CDM), these are the three articles in the Protocol that define the participation of developing country Parties in mitigation activities.

4.2 NAMAs are not limited to emissions reductions

The national obligation under Article 4.1 (b), which is the only provision of the Convention which could possibly be interpreted as providing for mitigation actions by developing countries, states that national or regional programmes containing measures to mitigate climate change cover both sources of emissions and sinks and reservoirs. This is further reinforced by the provision on international cooperation to conserve and enhance sinks and reservoirs of GHGs, '*including biomass, forests and oceans, as well as other terrestrial, coastal and marine ecosystems.*'

As previously stated, these implementing activities are to be provided with financial resources,

16 Article 10 (b) (ii) of the Kyoto Protocol.

including financing for transfers of technology on an agreed full incremental costs basis in accordance with Article 4.3. NAMAs covering the enhancement of sinks and reservoirs should be financed and provided with technology and capacity-building, in addition to these activities.

The same consideration is taken into account in the guidelines for developed country Parties' national communications, which state, under policies and measures, that mitigation actions 'need not have as a primary objective the limitation of GHGs.'[17]

What are subject to MRV are the actions themselves, and not necessarily the results or effects of these actions.

The proposal of the Group of 77 and China under the Bali Action Plan that the financial mechanism of the Convention be operationalized under the authority of the Conference of the Parties contains provisions for funds covering all mitigation activities, including those related to the enhancement of sinks and reservoirs.

This proposal also states that:

> *'any funding pledged outside of the Convention shall not be regarded as the fulfilment of commitments by developed country Parties under Article 4.3 of the Convention, and their commitments for measurable, reportable and verifiable means of implementation, that is, finance, technology and capacity-building, in terms of paragraph 1 (b) (ii) of the Bali Action Plan.'*[18]

Any funding for NAMAs that are channelled through financing institutions outside the framework of the financial mechanism of the Convention therefore cannot be considered or made subject to MRV.

5. Conclusions

1. NAMAs are voluntary actions by developing country Parties that are determined at the national level, are undertaken in accordance with their sustainable development objectives, and are not obligations under the Convention.

2. Only those NAMAs that are enabled and supported by financing, technology and capacity-building and which are measured, reported and verified can in turn be subject to MRV. Financing channelled through institutions outside the framework of the financial mechanism of the Convention cannot be counted as financing for NAMAs.

3. Poverty eradication and the pursuit of sustainable development are necessary in order to undertake mitigation actions. Article 3.4 provides that economic development is essential in adopting measures to address climate change.

4. The implementation of the commitments of developed country Parties related to financial resources and transfers of technology will determine the extent to which developing country Parties will be able to undertake mitigation actions.

17 Annex to Decision 9/CP.2, paragraph 20.

18 FCCC/AWGLCA/2008/MISC.2/Add.1, page 36, paragraph 6.

5. The financing of mitigation actions is additional to the commitment by developed country Parties to provide to developing country Parties, on an agreed full incremental costs basis, the implementing and enabling measures that are covered in Article 4.1 of the Convention.

6. Any further elaboration of the mechanisms or functions of NAMAs under the Bali Action Plan should build upon existing mechanisms within the Convention and be fully consistent with the principles, obligations and provisions of the Convention, as well as with the relevant decisions taken by the COP.

7. Any listing or registration of NAMAs that are enabled and supported in an MRV manner should be placed under the financial mechanism set up under the authority of the Conference of the Parties.

8. NAMAs should be financed through the financial mechanism to be operationalized under the authority of the COP.

9. In order to ensure that NAMAs contribute to the achievement of the objective of the Convention, they should not be financed through the carbon market, nor used as carbon offsets for developed countries.

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NATIONALLY APPROPRIATE MITIGATION ACTIONS FOR DEVELOPING COUNTRIES:

A Perspective from Southern Africa

Abstract
Many developing countries are already implementing climate change mitigation actions. In Bali, developing countries indicated their willingness to undertake additional measurable, reportable and verifiable mitigation actions, provided they receive the promised measurable, reportable and verifiable support from industrialized countries. The possible types of NAMAs under debate include voluntary and unilateral, supported and carbon credit NAMAs. Most southern African countries feel that NAMAs need to contribute to developing countries' sustainable development goals and boost their economic growth. The scope and scale of NAMAs has not yet been defined by the negotiations, but judging from Parties' proposals, they could include anything from voluntary renewable energy targets to boosting energy efficiency standards to deforestation projects, provided that international support is available and the additional mitigation benefit can be measured, reported and verified.

Climate change is one of the biggest threats facing mankind today. Science has clearly demonstrated the extreme urgency of taking real action to avoid irreversible damages to our planet. The Fourth Assessment Report (4AR) of the Intergovernmental Panel on Climate Change states that Africa will suffer the most from the impacts of climate change.

The priority for most developing countries is adaptation, but mitigation is also viewed as extremely important in order to safeguard future generations from the diverse and complex impacts of climate change. A certain amount of adaptation will be necessary, no matter what we do. The fear is that there will come a time where it will not be possible to adapt our way out of the problem.

According to the Convention, developing countries can voluntarily implement nationally appropriate mitigation actions (NAMAs) in the context of sustainable development, as well as following a clean development path now, up to and beyond

2012 to allow them to reduce their rate of emissions growth by comparison with 1990 levels.

Mitigation has been at the heart of the climate negotiations from the outset. As the next round of negotiations will focus on what developing countries might do on mitigation, the topic remains highly relevant. Movement on this topic started in Bali, where attempts were made to retain the Annex I/non-Annex I balance of mitigation commitments, as well as to increase the sense of urgency on both sides. The balance was outlined in paragraph 1:

> *(b) 'Enhanced national/international action on mitigation of climate change, including, inter alia, consideration of:*
>
> > *(i) Measurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives (QELROs), established under the Kyoto Protocol, by all developed country Parties, while ensuring the comparability of efforts among them, taking into account differences in their national circumstances;*
> >
> > *(ii) Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner'.*

One priority for southern Africa countries in Bali was that all developed countries, including the United States (US), adopt the Quantified Emission Limitation and Reduction Objectives (QELROs) established under the Kyoto Protocol. Of concern was that this was included only as an option in the final text.

There are various proposals for new sectoral market mechanisms for developing countries under consideration in the Ad hoc Working Group on the Kyoto Protocol (AWG-KP), and some of these have been discussed in parallel in the Ad hoc Working Group on Long-term Cooperative Acton (AWG-LCA). These essentially seek to leverage the power of the carbon market to support developing countries' NAMAs. Most southern African countries were not opposed to the financial windows that were proposed.

However, there is a strong feeling regarding southern African countries in particular that mitigation measures in agriculture and reducing emissions from deforestation can make a significant mitigation contribution. Concurrently, in both forestry and agriculture, there are synergies between mitigation, adaptation, sustainable development, food security and poverty alleviation. Many mitigation options can result in win-win situations, such as increasing food security or enhancing climate change resilience.

Countries in Southern Africa, like many other developing countries, is already implementing climate change mitigation actions, but only a few have climate change strategies in place. The sub-region generally concurs with other nations on the idea of developing countries introducing NAMAs with international support.

It is argued that, with support in the form of clean technologies and finance, NAMAs could contribute to creating real competitive economic advantages for Africa. Southern Africa feels that, in order to harness this opportunity, the region needs to define additional mitigation activities that could function as NAMAs. There is also a need for clarity on how financial and technological support would be directed.

However, there is a fear among southern African countries that public funding is unlikely to provide sufficient support to meet the full needs of both mitigation and adaptation. The carbon market is one viable option. A question arises as to whether investing in the NAMAs of developing countries would count towards meeting targets in industrialized countries. The region feels that it is critical that the negotiations clarify the generating mechanisms. Regarding policy approaches and policy incentives on issues relating to reducing emissions in developing countries, market mechanisms have enormous potential to act as an effective means to promote the large-scale investment required to reduce emissions. For this reason, it would be prudent to use market-based mechanisms that create carbon credits that are fully fungible with Assigned Amount Units (AAUs), Certified Emission Reduction (CERs) units, Emission Reduction Units (ERUs), etc. to the greatest extent possible.

It is a feeling not only in southern Africa but in Africa as a whole that, in order to develop a market capable of generating long-term private-sector investment, the required legal and regulatory infrastructure must be established in host countries. The developed country parties could make funds available to developing countries in the period up to 2013 to facilitate the diffusion of such infrastructure, examine the specific local and regional barriers, and establish the systems and resources to enable developing countries to participate in and benefit fully from the carbon market and to attract private-sector investment in forestry and sustainable land use.

This paper tries to provide more information on the above issues, starting with the introduction, which briefly sketches the history of the NAMAs, and ending by highlighting some concerns of southern African countries with regard to the financing of mitigation actions. The paper then turns to issues relating to the basis for mitigation. Section 2 introduces the issues relating to the potential for NAMA implementation. These include the possible types of NAMAs, sectoral approaches and support for NAMAs implementation. This discussion then leads into section 3, which deals with one of the contentious issues, the 'hot' topic of how mitigation actions can be made 'measurable, reportable and verifiable' (MRV). Before the conclusions, a discussion of the carbon financing prospects for NAMAs is presented.

There is a strong feeling regarding southern African countries in particular that mitigation measures in agriculture and reducing emissions from deforestation can make a significant mitigation contribution.

Potential for NAMA Implementation

Opinions of some countries frame the concern about equity in terms of per capita emissions, others argue that consideration of historical responsibility is a basis for a fair deal, while for yet others the dimension of equity relates to development. This approach draws on Article 2 of the Convention, in particular that climate protection should occur in a manner that 'enables[s] economic development to proceed in a sustainable manner'. More broadly, it argues that sustainable development in developing countries, including its ecological and social dimensions, is indispensable for an equitable solution, given that developed countries went through their process of industrialization without carbon constraints. In earlier debates under the Convention, the Republic of South Africa (RSA) put forward the ap-

proach of sustainable development policies and measures (RSA 2006b).

Sustainable development policies and measures suggest that developing countries themselves identify more sustainable development paths and commit to implementing these with financial support (RSA 2006a; Winkler et al. 2002a).

Southern Africa feels that these sustainable development policies and measures (SD-PAMs) may aim to encompass large-scale policies and measures, not only projects as in the CDM. Many southern African countries have weak policies with regard to climate change, and emissions of greenhouse gases in particular. However, under this approach (SD-PAMs), each country may define what it means by making development more sustainable. Funding for SD-PAMs could build on existing commitments in Convention Article 4.1(b) and Kyoto Protocol Article 10, but since they are development-oriented, they could also mobilize domestic and international development finance. Both climate and non-climate funding can be mobilized to implement SD-PAMs.

Progress in achieving both the local sustainable development benefits and climate co-benefits might be monitored through national institutions, but could also be reviewed internationally. Recent work has identified four broad methodologies for quantifying the effect of SD-PAMs on development and emissions (Winkler et al. 2008): (1) case studies; (2) national energy modelling; (3) analysis of sectoral data; and (4) inclusion of policies in global emission allocation models. The first two of these methods focus on the national or subnational levels in quantifying results. Case studies, by their nature, focus on a specific context, while energy modelling quantifies results (for energy and often also emissions) as a partial analysis of a national economy. Method 4 has a more global focus, being designed for the purpose of comparing international emission allocation schemes. Method 3 bridges the national/global divide by collecting fairly detailed data from countries (for selected sectors), but allowing international projections. A potential weakness of SD-PAMs is that the environmental outcome is uncertain: it depends entirely on the number and extent of policies implemented.

Possible Types of NAMAs

The first possible NAMAs could be associated with actions that developing countries would take voluntarily and unilaterally without support from developed countries. The least developed countries (LDCs) are engaged in drawing up National Adaptation Plans of Action (NAPAs) for climate change. The other developing countries have done the technology transfer needs assessments for climate change. All these efforts are aimed at addressing both mitigation and adaptation. These and other studies can form the basis for the formulation of sustainable development policies and measures. These actions should also be recognized as international actions for combating climate change once they are registered on the Registry. They should be interpreted as unilateral contributions from developing countries to global commons (See Table 1).

Secondly, there are actions that require support from developed countries. These are the actions that developing countries are willing to take with the support of financing and technology from developed countries. Developing countries could specify the details of the support they needed, in cases of a lack of capacity, they could simply list the need for capacity building as well.

Last but not least among possible NAMAs are those that can be associated with actions that developing countries are willing to take for the purpose of obtaining carbon credit as an outcome of implementing such actions. Reducing Emissions from Deforestation and Degradation (REDD) as well as Agriculture, Forestry and Other Land-Uses (AFOLU), would be good examples of such actions. Carbon credit could provide market incentives for investment in such actions. Most southern African countries support types 2 and 3, where support is generally provided.

Sectoral Approaches

The Bali Action Plan includes as one option in the mitigation building block cooperative sectoral approaches and sector-specific actions, in order to enhance implementation of Article 4, paragraph 1(c), of the Convention.

In terms of the Bali Action Plan, domestic sectoral efforts would be closer to nationally appropriate mitigation actions, while transnational sectoral agreements probably amount to mitigation commitments, at least for the sectors concerned. Whatever one's interpretation, it is clear that sectoral approaches are closely related to technology in the Bali Action Plan.

Developing countries have expressed concerns about transnational sectoral agreements, which they see as introducing commitments without recognizing the principles of equity and common but differentiated responsibilities and respective capabilities. For Annex I countries, policies and measures (many of which are implemented at the sectoral level) are intended by the Kyoto Protocol to achieve national caps or QELROs. However, there appears to be more agreement that, whatever the multi-lateral agreement, sectoral efforts are important in implementation at the national level. Framed appropriately, sectoral approaches may be helpful as one tool for mitigation.

A recent version of particular interest to developing countries may be sectoral crediting baselines (Ward et al. 2008). This particular variant would be implemented domestically in develop-

Table 1: Types of NAMAs

Type of NAMA	Description
1. Voluntary and unilateral	NAMA associated with actions that developing countries would take voluntarily and unilaterally without support from developed countries
2. Supported	Actions that require support from developed countries
3. Carbon Credit NAMAs	NAMAs associated with actions that developing countries are willing to take for the purpose of obtaining carbon credit as an outcome of implementing such actions

ing countries, with the 'no lose' meaning that exceeding a specified benchmark entitles a country to trade surplus emission reductions. There is no penalty for not achieving any sectoral standard, but there is an incentive to exceed the benchmark. Beyond the advantage of 'no lose', this variant may be attractive due to its focus on incentives and being voluntary.

Support for NAMAs

Financing

Designing a well-functioning mechanism to transfer financial resources and technology to developing countries to support their NAMA is another important element. The current situation is not clear on support for mitigation actions. The current financial flows are not predictable and dependable. No clear commitments have been made by the Annex I countries to support any mitigation actions. Uneven regional distribution of Clean Development Mechanism (CDM) projects has resulted in its failure in most African countries.

However, there is a general feeling within the southern African countries that with the restructuring of the current CDM, and learning from past experiences, a new financial mechanism could be agreed that would be more efficient in addressing especially the issues of regional distribution.

One of the crucial factors in scaling up financial flows to mitigation actions in developing countries is improving the commercial viability of investments. Under the current CDM, some projects are too small to attract investment from large-scale enterprises. For example, power generation is limited to 15 MW for small-scale projects. Large-scale mitigation projects are generally considered developmental and in some cases are not acceptable as additional under CDM. What is lacking is not money and technology, but a climate regime which could improve the commercial viability of investments for mitigation. Once this is addressed, then the market will drive finance and technology to flow to mitigation actions in developing countries.

As NAMAs are incentive-based, southern Africa feels that international financial and technology support for NAMAs should come from a range of sources mobilized by Financial and Technology Mechanism(s). The support provided would then be measured by developed countries, indicating an allocation and transfer of finance for means of implementation over and above Official Development Assistance (ODA) in units of an agreed common currency.

Technology Transfer

On the stimulation of technology development, diffusion and transfer, one of the most effective moves that Parties and countries could make is to establish a global price for carbon emissions and allow unhindered access to offsets for up-capped sectors. This would promote and enhance investments in clean technology development and diffusion in developed and developing countries alike. There is a need for CDM implementation reforms in order for technology transfer to succeed. Once this is done, the ability of market-based mechanisms to facilitate the transfer of clean technology will be enhanced. In principle, the future of market-based mechanisms looks bright.

Any new market-based mechanisms, such as no-lose targets with crediting, would certainly scale up such transfers to developing countries dramatically as long as they ensured incentives for developed- and developing-country private-sector actors to take part. The expansion and

improvement of programmatic CDM or a move towards the use of standardized baselines and/or positive lists for the determination of additionality in 'regular' CDM would have a similarly positive effect on technology transfer and diffusion, albeit on a smaller scale.

However, there are some technologies that require more than the carbon market pricing to bridge the gap to economic competitiveness. For these technologies, the development of a market needs to be accompanied by other policies, measures and instruments. In that case governments could consider innovative funding arrangements for such technologies, such as the use of domestic auction revenues to support the demonstration of critical technologies like Carbon Capture and Sequestration (CCS). Of course, CCS is still contentious.

There might also be a need to explore the possibility of creating an international mechanism for technology development or transfer to provide credits for participation. Developed countries could measure the technology transfer, including development, application and diffusion, in units established according to indicators being developed under the auspices of the Subsidiary Body for Implementation (SBI) and Subsidiary Body for Scientific and Technological Advice (SBSTA). The agreed full incremental costs for technology transferred to developing countries would then be reported in units of an agreed common currency.

Capacity Development

Effective and efficient governance and institutional arrangements are critical to ensuring that the objectives of the NAMAS are fulfilled in a transparent, efficient, timely and accountable fashion. Every effort should be made to increase administrative simplicity and minimize transaction costs. Governance arrangements will need to be developed for new flexibility mechanisms, such as sectoral crediting. In doing so, Parties should be careful not to duplicate roles, functions and processes, but also be prepared to learn from experiences in the first commitment period.

The current financial flows are not predictable and dependable. No clear commitments have been made by the Annex I countries to support any mitigation actions.

There is a good case to be made for re-examining the structure and operation of the CDM and its project approvals system in order to facilitate an increased flow of crediting proposals post-2012. There is a need to strengthen the Designated National Authorities (DNAs). The capacity-building required applies to the individual, institutional and systemic levels. Most of the individuals who constitute the DNAs do not participate in climate change activities in their day-to-day work and thus need awareness and in some cases short courses on climate change mitigation. In order for institutions to support the activities of the DNAs, there is a need for awareness as well as equipping these institutions with the required hardware and software. With regard to the systemic levels, there is a need for awareness by policy-makers and consequently for policy reviews. The current policies in various southern Africa countries do not accommodate even CDM itself. DNAs in most southern African countries have never approved any CDM projects. The focal points need capacity-building in order for them to have a better appreciation of the NAMAs and their roles in climate change. Some focal points in some southern African countries are not active participants in the UNFCCC process. No new institutions may be needed to handle the NAMAs.

Developed countries can be free to measure the support for capacity-building according to indicators and in units to be established in the review of the capacity-building framework.

NAMAs Registration

The issuing of a register is one of the core elements in any negotiating text addressing paragraph 1 (b) (ii) of the Bali Action Plan. The register is a mechanism to enhance the implementation of the relevant provisions of Article 4, paragraph 1 of the Convention, which deals with mitigation action to be taken by developing countries in the context of their overriding poverty alleviation and sustainable development priorities and in accordance with the principles specified in Article 3 of the Convention, particularly their common but differentiated responsibilities and respective capabilities. The extent to which developing country Parties will effectively implement their commitments under the convention will depend on the effective implementation by developed country Parties of their commitments under the convention related to their financial resources and transfers of technology (Article 4, paragraph 7 of the Convention). The register enhances the implementation of Article 4, paragraphs 3 and 5 of the Convention by facilitating the identification, mobilization and matching of the financial, technology, capacity and other support required to implement nationally appropriate mitigation actions (NAMAs) which are submitted by developing countries in terms of Article 12, paragraph 4 of the Convention.

As such, the register provides a practical mechanism to enable the international recognition of developing country mitigation action and to enhance its communication in terms of the relevant provisions of Article 12 of the Convention.

Southern African countries, like most developing countries, feel that NAMA registration should be voluntary. Each Party may register the content of NAMAs as well as the kind of support they need to implement them. It could also specify, if possible, the expected quantity of mitigation resulting from its NAMAs. Implementation plans, such as timeframes, could also be registered: the subregion has no objection to this.

There is a feeling in the region that the UNFCCC Secretariat should open and maintain the register of NAMAs, which should include the actions that developing countries want to submit, the identified support required, and the emissions that would be avoided, relative to baseline. This emanates from the convention, which does not discuss binding emission reduction requirements by developing country parties, only voluntary mitigation actions.

Others feel that NAMAs may comprise individual mitigation actions, sets of actions or programmes. Developing countries may choose from a variety of forms of action, including REDD, programmatic CDM modified to fit into NAMAs, no-lose sectoral crediting baselines and others. The register should initially contain a list of *indicative* mitigation actions proposed and the support needed to implement them, as well as information related to the assumptions and methodology underpinning the proposed action, the emissions that would be avoided relative to baseline and the required support for the indicative mitigation actions.

A number of developing countries propose that the assumptions and methodology underpinning the proposed action and the required support for the indicative mitigation actions should be assessed by a Technical Panel established under the Convention. Once the Technical Panel reports that the action and support have been es-

tablished using good practice, a request to the Financial and Technology Mechanism(s) of the Convention is triggered.

On an annual basis, the register should be updated to reflect the status of implementation of an action and its support. Following the first MRV report, the NAMA should be considered *registered* (and no longer indicative).

Measurable, reportable and verifiable

Another contentious issue in the current negotiations pertains to concerns by some Parties and organizations on what needs to be measured, reported and verified. Some organizations, like the International Emissions Trading Association (IETA), believe that all commitments under the convention and associated actions, by both developed and developing country Parties, should entail measurement, reporting and verification. As developing country Parties, the countries of the southern Africa sub-region strongly feel that such monitoring should be based upon the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines, which must be accompanied by guidance to enable detailed and consistent MRV at the appropriate sector level. However, the region feels that the emission reductions relative to baseline should be measured by the Party implementing the mitigation action in tons of carbon dioxide equivalent, according to multilaterally agreed guidelines and methodologies.

Most southern African countries feel that it is important for developing countries to take action to reduce their own emission trajectories, but with the assistance of developed country Parties. They should also do so in line with their cumulative emissions, mitigation potential and opportunities, bearing in mind national circumstances and the principle of common but differentiated responsibilities and respective capabilities. Countries should now be prepared to pursue a clean development path up to and beyond 2012 through measurable and verifiable actions that result in significant deviations in emissions growth from business-as-usual scenarios.

Renewable energy and energy efficiency policies and measures should form the central pillars of future climate mitigation strategies involving NAMAs. Expanding access to renewable energy and energy-efficient technologies should be the key strategy for engaging developing countries in mitigation efforts.

The current carbon markets have proved to be ineffective in developing countries, particularly in Africa, where very little has been done in terms of CDM

Technologies that increase dependence on carbon-intensive fuel sources should be discouraged. Technologies that generate additional or new environmental and health risk challenges for the international community, such as nuclear power, should not be included in the energy mix.

On what needs to be measured, reported and verified in relation to actions, the sub-region feels that energy efficiency targets and renewable energy targets can form a useful mechanism for assessing progress. National renewable energy targets, accompanied by concessionary financing from the international community to assist in achieving them, can be helpful in addressing both climate change and sustainable development.

On the issue of reporting, there is a strong feeling amongst developing countries that mitigation actions implemented by developing countries with their own resources should be reported in national communications, thus enhancing implementation of Article 12.1 of the Convention. In addition, developing countries may voluntarily choose to register actions undertaken with their own resources, but for which they are not seeking multi-lateral support. Such actions are registered for recognition purposes only.

Developing countries could be the driver of the global carbon market if they could generate carbon credits from their NAMAs in a MRV manner.

Mitigation actions receiving support should be reported to the registry. Reporting on the status of implementation to the registry should be annual, with an update based on measured outcomes every two to three years, alternating with reporting on GHG inventories.

It is the suggestion of the Africa group as whole that developed countries need to report on the measurement of support they may be providing to developing Parties in their national communications under Article 12.3.

In terms of verification, the proposal by South Africa and supported by many other countries in the sub-region on NAMAs has been fairly accepted. According to this proposal, NAMAs supported with public funding from developed countries and not resulting in the transfer of carbon credits should be verified, together with the support as measured and reported, through modalities and procedures to be established under Convention and according to multi-laterally agreed guidelines.

However, NAMAs financed through the carbon market and market finance should be verified together with the support as measured and reported, by institutions accredited by the COP and according to the same multilaterally agreed guidelines. Independent third-party verification may be used, but must result in a verification report considered by a body under the authority and guidance of the COP and in accordance with multi-laterally agreed guidelines.

NAMAs undertaken with a country's own resources may be verified by national entities working to multi-laterally agreed guidelines and reported in National Communications.

For supported actions, developed country Parties, including those in Annex II, should provide new and additional financial resources to meet the agreed full costs of verification undertaken by developing countries.

Carbon Financing Prospects for NAMAs

Current carbon markets

The current carbon markets have proved to be ineffective in developing countries, particularly in Africa, where very little has been done in terms of CDM. This implies that it will be difficult to convince some of the developing country groups of any mechanism without concrete guarantees that it will not be yet another CDM. Under CDM, little if any new technology was transferred to southern Africa, and only small amounts of capital have been mobilized for climate change mitigation as we approach the end of the first commitment period.

Irrespective of the ineffectiveness of the current market mechanism for southern Africa, there is still hope that, with proper planning and commitment, the market still remains critical for mobilizing capital and technology transfer on the scale needed to achieve the ultimate objective of the convention. There is a need for genuine commitment to meeting the challenge of climate change and to come to agreement in Copenhagen.

Regarding the extension, scaling-up, reviewing and improvement of the current market-based mechanisms, some international organizations feel strongly that, regardless of any moves to differentiate among developing country Parties in the post-2012 period, the operation of the existing flexible mechanisms should continue. Indeed, reform and expansion of the flexible mechanisms are crucial for an effective post-2012 framework. If the reforms are acceptable, then southern Africa is ready to support this.

Southern Africa also strongly believes that problems with existing mechanisms should be addressed within the UNFCCC negotiation process rather than uni- or bi-laterally by major country buyers. Adding uni- or bi-lateral qualitative or quantitative restrictions to the CDM only introduces uncertainty and confusion into the market. CDM requires reform so that activities can be scaled up, geographical distribution enhanced, and environmental integrity assured beyond doubt. The sub-region also is of the opinion that the necessary reform will require significant changes to the CDM's governance and management system.

Future carbon markets

Many new market-based mechanisms have been proposed by the Parties as a method of incentivizing mitigation action in developing countries. Examples include the establishment of sectoral or economy-wide 'no-lose' targets, where credits would be issued for over-achievement of the target, or crediting on the basis of nationally appropriate mitigation actions.

The cost of one ton of CO_2 emission reduction is from only a few dollars for many developing countries to around 20 USD, while for developed countries it ranges from 153 USD to 234 USD. It would be appreciable and acceptable if we could design a climate regime which allows developing countries to sell carbon credit generated from their NAMA done in a MRV manner, so that the revenue from the sales of these credits can scale up finance and technology flows to the mitigation projects in developing countries. At the same time, it will reduce the total cost of global mitigation. According to one particular model, a global trading system that includes developing countries could reduce global mitigation costs by 70% (Submission of Republic of Korea to the UNFCCC Negotiation process).

In order to make such a global carbon-trading scheme function, there have to be demands for carbon credits from the NAMAs of developing countries. Annex 1 countries have already agreed to support the mitigation actions of developing countries by transferring finance and technologies. Thus buying carbon credit does not represent a new or additional burden for Annex 1. Buying carbon credit more cheaply than the cost of domestic mitigation within Annex 1 will be beneficial for Annex 1 credit buyers. Many developed countries have announced that they are going to offer varying sizes of climate funds to support developing countries. Accepting a deeper target to buy credit from developing countries will not be much different than offering funds.

Since the Emissions Trading System (ETS), a carbon trading scheme for the European Union (EU), is reported as functioning efficiently in minimizing the costs of mitigation among European countries, why not expand the Global Carbon Market to embrace developing countries as the main players? Developing countries could be the driver of the global carbon market if they could generate carbon credits from their NAMAs in a MRV manner.

If the concept becomes acceptable, NAMAs should be integrated into national mitigation strategies in the form of national low-emission development strategies.

Whilst current CDM is already functioning as a carbon credit mechanism for developing country projects, the CDM in its current project-specific form is not able to generate the financial flows needed under a 'global deal.' It is estimated that climate stabilization will require 20-75 billion USD by 2020 and up to 100 billion USD by 2030 (Submission of Republic of Korea to the UNFCCC Negotiation process). The capacity of current CDM is about 400 projects registered per year and 6 billion USD at current carbon prices. Awarding carbon credit for NAMAs will be a concrete idea to scale up current CDM in a more enhanced manner. CDM is already known, and its potential benefits have been assessed. Once scaled up with regional distribution in mind, the new hybrid mechanism would be an appropriate incentive for climate change mitigation in developing countries.

Programmatic and sectoral CDM based on efficiency standards could be an option to operationalize the idea of credit for NAMAs using a wholesale approach. In balancing the quality of credit from NAMA and project-based CDM, we can differentiate the price of credits depending on quality.

As NAMAs will be taken in the context of sustainable development by developing countries, a carbon market based on NAMA carbon credit will be more conducive to sustainable development.

There is a great deal of interest in the use of markets to enhance the cost-effectiveness of, and to promote, mitigation actions.

NAMAs and REDD

REDD and AFOLU are issues that have gained momentum in the climate change negotiations. REDD is at an advanced stage of negotiations, while AFOLU has been recommended by Africa for further discussions. Regarding policy approaches and policy incentives for reducing emissions from deforestation and degradation in developing countries and the role of conservation, the sustainable management of forests and the enhancement of forest carbon stocks, most developing countries believe that market mechanisms have enormous potential to act as an effective means to promote the large-scale investment required to reduce emissions from deforestation, forest degradation and land-use change. For this reason, the use of market-based mechanisms may create carbon credits that are fully fungible with AAUs, CERs, ERUs, etc. to the greatest extent possible.

However, it is apparent that the sustainable management of forests and the enhancement of forest carbon stocks require long-term investments and the application of modern techniques and management skills. In order to develop a market that is capable of generating such long-term private-

sector investment, the required legal and regulatory infrastructure must be established in developing countries, particularly regarding land ownership and the enforcement of forest conservation deeds.

Conclusions

If the concept becomes acceptable, NAMAs should be integrated into national mitigation strategies in the form of national low-emission development strategies. Drawing up plans for NAMAs for all sectors would be the initial step. Such plans should build on existing plans and implemented actions that many developing countries are already undertaking. This should include, as a priority, the establishment and development of the necessary institutional frameworks for systematic national inventories for emissions and removals.

If NAMAs could include anything from renewable energy projects to reducing emissions from deforestation projects, to mitigation actions in agriculture, provided the additional mitigation benefit can be measurable, reportable and verifiable, they would be of huge potential benefit for African countries. For example, renewable energy projects that are supported through a Copenhagen deal could contribute to providing access to energy for many Africans. This would drive economic growth and contribute to the creation of a clean, sustainable and independent energy future.

Most of the issues covered above represent a real challenge for the AWG-LCA and for the negotiations. The discussion above is necessarily general, but there is an urgent need now to become specific, and to deal with real-world examples rather than high-flown principles. Each of the issues needs to be examined from the perspective of the financial sector if there is to be any chance of the substantial private-sector investment and contribution that the Parties, the UNFCCC Secretariat and other stakeholders are all looking for.

It will be important to award carbon credit in a scaled-up and wholesale manner for the verifiable mitigations from the NAMAs of developing countries to take effect. If Annex 1 countries adopt deeper targets to generate demand for these credits, this has the potential to expand the global carbon market so that developing countries could play a more active role. Once these measures have been achieved, the commercial viability of investment for mitigation actions in developing countries will be improved, and financial flows for the mitigation of developing countries in the form of NAMAs will be scaled up.

Copenhagen is an opportunity for Africa to secure benefits from stepped up climate change action that will contribute to both poverty eradication and sustainable development.

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AN OBSERVER'S PERSPECTIVE*

The Trust Building Role of NAMAs

Abstract:
Trust leads to empowerment and teamwork, which are needed to have a chance against climate change. Trust has been lost in the climate change negotiations and must be restored if an ambitious agreement is to be achieved. In this trust-building process, NAMAs can play a central role. The article unfolds this role from three perspectives: 1) global mitigation and the ongoing negotiations; 2) the achievement of sustainable development at the national level; and 3) synergies between mitigation and adaptation. NAMAs can be instruments for mitigation, building political will, matching all actions in all developing countries with appropriate support, capacity-building and even adaptation.

Trust is a vital concept. Only trust can lead to empowerment and effective teamwork, and these are key capabilities that must be developed and strengthened at the international level if we wish to have a chance against global climate change. In the search for solutions, we need, as nations, to trust ourselves and our ability to contribute, but we also need to trust each other if collectively we are to combat a global problem that needs a global solution.

It does not take an expert to conclude that in the climate change negotiations trust has been lost after seventeen years of constructive but not necessarily fruitful discussions. Furthermore, in this context of distrust, science now shows us that efforts have failed by a long way to achieve a stabilization of the greenhouse gases (GHG) that cause climate change, while recent impacts show us that, although adaptation to climate change is vital, it is not really happening in developing countries.

* This article does not reflect on Peru's position on the climate change negotiation process under the UNFCCC, nor on the position of Latin American countries or the G77.

Nationally Appropriate Mitigation Actions by developing countries (NAMAs) have become a thorny issue in the climate change negotiations. The term was first introduced back in 2007 as part of the Bali Action Plan (BAP), but its exact definition is still subject to intense discussion. In the context of NAMAs, there is a main difference between asking for support first in order to act later, and offering to act first and asking for support later: the difference lies in trust. Trust must definitely be restored between Annex I and Non Annex I Parties.

Trust must also be built between Non Annex I Parties. Developing countries need to trust themselves and each other in order to remain unified and contribute to global mitigation efforts. We must also remember that developing countries are not responsible for the current climate change and that adaptation remains their main priority and concern; therefore, as they start becoming involved in mitigation efforts, they need to consider adaptation so that they can be sure that mitigation will not make things worse for their ecosystems and populations.

"The existing lack of a definition for NAMAs can be an opportunity to give them a central role under the climate change negotiation: a trust-building role."

This article argues that, in order even to begin to conceive an ambitious agreement that will effectively tackle climate change, an environment in which trust can be restored must be put in place. It also argues that NAMAs *can* and *must* play an essential role in this 'trust-building' process. The existing lack of a definition for NAMAs can be an opportunity to give them a central role under the climate change negotiation: a trust-building role.

In order to understand NAMAs and their potential fully, the article presents facts and background relating NAMAs in two initial sections, after which it looks at them from three different perspectives: a) their role in global climate change mitigation and the current negotiation process; b) their role in the achievement of sustainable development at a national level; and c) their connection to climate change adaptation as a main priority for developing countries in light of the existence of unavoidable climate change.

The scientific facts

Climate change is happening, it is a result of human activity and it is causing all kinds of impacts on ecosystems, which are in turn the basis of human activities. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) draws attention to the fact that most of the temperature rise in the last fifty years can be attributed to human activity. It also shows that human activity will continue to influence the composition of the atmosphere, even if GHG emissions dropped to a point at which their atmospheric concentration would stabilize.[1] It is in light of these facts that measures to support the adaptation of economies and societies that are particularly vulnerable to the adverse effects of climate change must be considered as essential complements of any global effort to stabilize GHG levels in the atmosphere.

Although it is not technically feasible to determine each developed country's exact historical

1 IPCC Fourth Assessment Report, 2007.

responsibility for climate change, it is a fact that current impacts are a consequence of the GHG emissions put into the atmosphere by these industrialized nations in the past. This is the basis for most of the articles in the United Nations Framework Convention on Climate Change (UNFCCC), which, based on the principle of 'common but differentiated responsibilities', stresses the need for global action led by developed countries. Furthermore, Annex I of the UNFCCC is an integral part of the Convention and lists the group of developed countries and economies in transition that have commitments under this legally binding treaty (these countries are often referred to as 'Annex I' parties, whereas developing countries go by the name of 'non-Annex I' parties).

It is also a fact that future climate change will be the result of our actions today and in the coming decades, and that it will no longer be caused only by developed countries, since the increase in GHG emissions shows a direct relationship with economic growth, and this growth is currently taking place mainly in the developing world. The following table shows the range of difference calculated by the IPCC between emissions in 1990 and emission allowances in 2020/2050 for various GHG concentration levels for Annex I and non-Annex I countries as a group. Clearly, science calls for a contribution from the developing world in order to achieve stabilization.

A definition for NAMAs

NAMAs were first conceived under the Bali Action Plan (BAP) or decision 1/CP.13 of the UNFCCC. In referring to NAMAs, paragraph 1 (b) (ii) is generally quoted:

> The Conference of the Parties […] 1. Decides to launch a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012, in order to reach an agreed outcome and adopt a decision at its fifteenth session, by addressing, inter alia: […] (b) Enhanced national/international action on mitigation of climate change, including, inter alia, consideration of: […] (ii) Nationally appropriate mitigation actions by devel-

The range of difference between emissions in 1990 and emission allowances in 2020/2050 for various GHG concentration levels for Annex I and non-Annex I countries as a group

Scenario category	Region	2020	2050
A-450 ppm CO_2-eq	Annex I	-25% to -40%	-80% to -95%
	Non-Annex I	Substantial deviation from baseline in Latin America, Middle East, East Asia, and Centrally-Planned Asia	Substantial deviation from baseline in all regions
B-550 ppm CO_2-eq	Annex I	-10% to -30%	-40% to -90%
	Non-Annex I	Deviation from baseline in Latin America, Middle East, and East Asia	Deviation from baseline in most regions, especially Latin America and Middle East
C-650 ppm CO_2-eq	Annex I	0% to -25%	-30% to -80%
	Non-Annex I	Baseline	Deviation from baseline in Latin America, Middle East, and East Asia

Source: IPCC.

> oping country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner.

We can take some important features of NAMAs from this particular paragraph: they must be 'nationally appropriate', meaning that they should respond to national circumstances, which also implies that each country shall determine what is 'appropriate'; they are referred to only as 'actions', so there is no definition of scale: an action can be an activity, a measure, a project, program, or even a policy; they must be carried out 'in the context of sustainable development', meaning that they should be integrated into development and poverty eradication efforts; and they must be 'supported and enabled by technology, financing and capacity-building' in a way that is 'measurable, reportable and verifiable' (MRV). It appears, then, that, in contrast to commitments and actions by developed countries under 1(b)(i) which must be MRVed, in the context of NAMAs MRV refers to their support and enablement. It is important to note, though, that, even though not all developing countries are as yet able to MRV all their mitigation actions and therefore to commit themselves to it, MRV for NAMAs is of great significance for environmental integrity and must be supported and achieved.

It is important to note that issues such as the voluntary or mandatory nature of NAMAs, the geographical or political level at which they should be implemented and their particular source of support (public, private, national or international) are not specified in 1(b)(ii). One can then presume that there is a certain flexibility and that it is each country's prerogative to decide on the nature, scale and source of support for their NAMAs (hence the 'nationally appropriate' part). Later in this article we will see how this flexibility permits developing countries to enter a continuous process at different stages, in which different capacity-building activities are combined with different scales of emission reductions.

However, NAMAs also need to be framed in the context of the UNFCCC and the BAP as a whole. The UNFCCC gives overall guidance covering a concrete objective, guiding principles and a description of how the main issues for tackling climate change must be addressed. Although some of these issues, such as education, training and outreach, and research and systematic observation, are of the utmost importance in combating climate change, they have not been specifically addressed by the BAP.

The BAP's preamble sets out the context for 1(b)(ii) and must be taken into account. The said preamble expresses a renewed sense of urgency, reaffirms that economic and social development and poverty eradication are global priorities, and recognizes that deep cuts in global emissions will be required. Paragraphs 1(b)(iii) to 1(b)(vi) of the BAP are significant as they provide a menu of feasible mitigation options, including policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation, the role of conservation, the sustainable management of forests and the enhancement of forest carbon stocks in developing countries (REDD+[2]), and cooperative sectoral approaches and actions. They also propose various approaches, including the use of markets to make mitigation more cost-effective, and they call on Parties to take into account the economic

2 This concept was first introduced in COP 11 as only REDD (Reducing emissions from deforestation in developing countries), later on in the negotiations the second 'D' would become 'desertification'. In the BAP the 'plus' (+) was added referring to the sentences after the semicolon in 1b(iii): '; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks'.

and social consequences of response measures, including impacts on commerce. Finally, 1(b)(vii) addresses the catalytic role of the UNFCCC in engaging other important stakeholders such as the private sector and civil society. Although often overlooked, this paragraph is definitely worth noting since only global engagement will solve the climate problem.

The rest of the BAP must also be considered, given that mitigation by developing countries needs to be enabled by technical and financial cooperation, and is strongly linked to adaptation (this link will be further discussed later in the article).

NAMAs for global mitigation

There is a main difference between asking for support first in order to act later, and offering to act first and asking for support later. The difference lies in trust.

Ambitious mitigation is fundamental: not only will it prevent us from irreversible impacts in the future, it will also send a clear message to the international community, the private sector and civil society, thus building trust among countries and peoples. NAMAs have a central role to play in both global mitigation efforts and the current negotiation process, in which some Annex I countries are failing to put forward ambitious mitigation commitments.

Nationally appropriate mitigation actions by developing countries can not only provide real reductions. If defined in a flexible manner, they also have the potential to generate enabling environments for non-Annex I countries at different stages of development and to participate progressively in global mitigation. Moreover, they can put political pressure on developed countries that have not yet engaged fully in the mitigation effort.

".. future climate change will be the result of our actions today .."

Of course, implementing NAMAs will be challenging for developing countries. However, they are necessary to avoid greater impacts in the future, and, with the right amount of support, they *can* materialize. In most developing countries they are already being implemented at some level, and it is only a matter of finding ways to quantify, scale up and integrate them into one comprehensive mitigation strategy.

Moreover, a recent study of the Latin American region shows that, taking into account the regional costs of mitigation and of adaptation to the expected impacts of climate change, the region is better off following a bold mitigation pathway within a global effort resulting from an ambitious agreement than by focusing on adaptation alone.[3] This is mainly because adaptation costs are much higher than mitigation costs and because they increase exponentially with weak mitigation efforts. Also, bold mitigation by all countries would not only decrease adaptation costs, but also increase the size of carbon markets, thus providing additional private funding to cover mitigation costs.

Now, as said before, trust must be restored. Annex I countries must show their willingness to fulfill their commitments under the Convention, regarding not only mitigation but also the provision of financial resources and technology

3 Garibaldi. 'The Economy of Boldness', July 2009.

transfer to developing countries. Again, NAMAs can serve as one of the instruments to facilitate the fulfilment of these obligations.

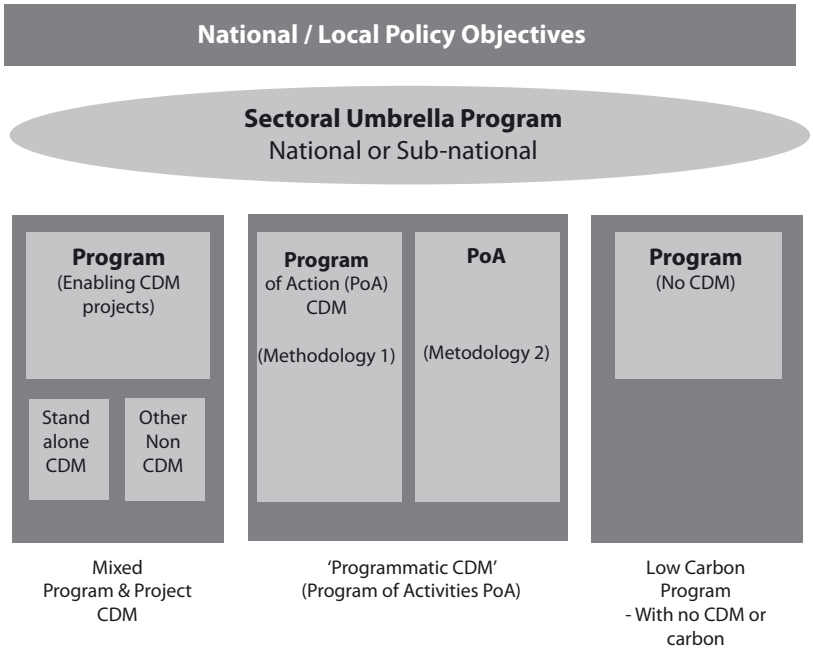
NAMAs for national sustainable development

Differentiation does not mean separation: developing countries need to trust themselves and each other to remain unified.

Developing countries still have the same development and poverty-alleviation priorities to bring them together, but they do not necessarily have equal responsibility for future climate change, nor equal capabilities to address it. Heterogeneity and diversity among developing countries call for a *flexible* approach to address NAMAs. As previously stated, the characterization of NAMAs allows for a national definition of the nature, scale and form of support for these 'nationally appropriate' actions.

The legal nature of NAMAs will probably remain voluntary in the short term, since even developing countries with the best economic and social indicators are still falling far behind Annex I countries. In time flexibility will allow countries to take on more ambitious no-lose targets, and, once barriers have been removed and sufficient capacity has been developed, to undertake legally binding commitments. An important provision is that increasing ambition should be accompanied by increasing support.

Figure 1: National mitigation actions at different scales



Source: J. Garibaldi. 'Strategic Program Approaches', 2008

The issue of scale must also be considered as part of a flexible approach. The differences in national circumstances are evident from the experience of the Clean Development Mechanism (CDM). Clearly, some countries have been able to participate actively in mitigation through CDM project development and must now aim to scale up their efforts with programmatic and even sectoral policy approaches. Others, however, have failed to do so, demonstrating that the project level cannot yet be taken as the smallest scale possible. Figure 1 shows the range of scales for mitigation action.

These different circumstances and the different readiness of countries and of sectors within countries allow a 'nested approach'[4], as well as South-South cooperation. The nested approach was first introduced as part of the discussions on REDD, but its overall concept and main features are perfectly applicable to other sectors, as presented in Garibaldi's work on Strategic Program Approaches. It basically states that, since not all countries are ready to engage in action at the national level, they could start from single projects and aggregate them to generate programs, policies, sectors and finally national targets. It also argues that, whereas it is essential to integrate sub-national activities into broader public programs, rewarding such sub-national activities could be de-linked from the risk of broader program failure in the short term. Ideally, in the long run, in order to maintain environmental integrity and avoid double counting, once a sector has reached the capacity for a sectoral NAMA, project activities for that sector should not be accounted for.

A 'nested approach' applied to mitigation actions in all sectors could allow for a mechanism that awards emission reduction credits to participants in mitigation activities while promoting action on both the national and sub-national levels. It could also help enhance the contribution of developing countries to global emission reductions that is consistent with the principle of common but differentiated responsibilities.

Finally, there is also some flexibility involved in deciding the best ways to provide NAMAs with the appropriate financial, technical and capacity-building support. In the past, there have been two main sources of support for mitigation actions by developing countries inside the UNFCCC: the carbon market through CDM, and the Financial Mechanism of the Convention (entrusted to the Global Environmental Facility or GEF). As already noted here, not all developing countries have been able to participate in CDM, and even those who have, have experienced that CDM is not an adequate source of funding or technology transfer because of the high transaction costs and the barriers that have allowed only a few countries to participate effectively. The GEF, on the other hand, has suffered from a continuous lack of funds, and its allocation criteria have favoured big emitters under the concept of 'global environmental benefits'.

A new financial architecture under the UNFCCC needs to be built, financial resources must be dramatically increased and CDM needs to be reformed. Within this new financial structure there should be certain flexibility for each country to decide how to support their NAMAs. Support for NAMAs could consist of a mix of international public support (for capacity-building at every level and sector and policy NAMAs), carbon offsets (at the project, program and policy levels) and national finance (for win-win solutions,

4 CATIE, 'The Nested Approach: A Flexible Mechanism to Reduce Emissions from Deforestation', November 2007.

NAMAs that are cost-effective and have important co-benefits). Cost-benefit assessments could be carried out to determine the mix.

Capacity-building plays a drastic role for NAMAs, but it has to be tailored to address the different needs of different developing countries. For least developed countries (LDCs), there is a need for even more flexibility: small-scale activities must be promoted and additionality assessments simplified, or even removed, in order to follow a more 'learning by doing' approach. An important capacity-building need for all non-Annex I countries is the strengthening of GHG inventory systems (still being improved even in Annex I countries) in order to quantify developing countries' efforts more effectively. In general and for all scales, different stages or phases of readiness and engagement should be defined, but with flexibility depending on the country and even on the sector of the country's economy.

"Of course, implementing NAMAs will be challenging for developing countries."

The question of readiness also calls for flexibility, and here a proposal made in the context of REDD negotiations could be applicable. The Parties have made many suggestions that an operational framework for REDD+ action should be developed to deliver effective means of implementation and finance by phases. It is argued[5] that such an approach would be useful for building confidence, enabling early action and considering how different sources of funding might be combined. The three phases defined for REDD+ action that might also be applicable to all mitigation actions are: 1) *Preparation and Readiness*: involves the development of strategies and capacity-building, and could be supported through public and private, multilateral and bilateral grant schemes; 2) *Intermediate*: involves the establishment or strengthening of policies and measures to allow implementation. Options for funding could include voluntary contributions from governments, levies, multilateral concessional financing sources, bilateral and private funding, and early market payments; 3) *Final*: involves verification of emission reductions or removals by sinks. Mechanisms such as the carbon market and fund-based mechanisms could deliver performance-based payments. Entry into all phases would be different for each country.

All NAMAs, no matter what their nature, scale or source of funding, should be quantified and registered. The first reason for this is environmental integrity. Furthermore, there are many developing countries that are implementing NAMAs using their own resources and that need appropriate ways to quantify them in order to put them forward later as their contribution or even subtract these reductions from future mitigation targets. Also, appropriate and enhanced MRV promoted at the national level would lower transaction costs and increase the prices of carbon credits. For all countries, but especially the least developed countries, innovative approaches need to be developed, and flexibility can also contribute to this. These innovative approaches could include NAMAs with a large component of education and outreach that reduce, and even more 'avoid' emissions (e.g. educating a new generation of conscious citizens), and have the potential to change not only production but also consumption patterns that contribute to climate change. There is a need to develop a new set of indicators to measure these contributions in order to implement them effectively.

5 IUCN, 'Operational Framework for REDD action with specific reference to means of implementation and finance', October 2009.

For each developing country, NAMAs should aim to support sustainable development and economic growth. For this to be implemented, countries must integrate their NAMAs into development and poverty reduction strategies and plans. Countries that account for larger percentages of global GHG emissions must focus first on the actions that can result on the largest GHG reductions, while other countries should focus on those actions that are low cost, have high return rates, are no lose and bring co-benefits such as air quality improvement and adaptation. The following text box illustrates this concept of 'flexibility' further by means of the example of a specific country (Peru).

Synergies between NAMAs and adaptation

Never before has the saying 'the best defence is a good offense' made more sense, and we need to trust that mitigation will not make things worse.

One may try to ease the symptoms or consequences of any illness or problem, and one may even temporary succeed in this attempt. However, if the source is not identified and dealt with, the chances are the illness will come back, and more strongly every time. Such is the case with climate change: one may try to adapt to its adverse effects, but only the mitigation of GHG emissions can prevent these effects from growing incrementally worse.

It is true that the best adaptation is mitigation, not only because mitigation will prevent more acute impacts from occurring in the future, but also because strong links between mitigation and adaptation become apparent when they are both considered in the context of sustainable development.

Chapter 18 of the IPCC Fourth Assessment Report on mitigation addresses the inter-relationships between adaptation and mitigation, showing how this issue has recently captured the interest of the scientific community. Moreover, this issue definitely deserves more attention in the future, as it is highly relevant to many developing countries that are vulnerable to the impacts of climate change yet paradoxically make a low contribution to global GHG emissions. Figure 2 shows how adaptation and mitigation to climate change interact in the earth and human systems.

".. there should be certain flexibility for each country to decide how to support their NAMAs."

Look closely at the figure. Let us start at the far right, with climate process drivers in the human system: GHG and aerosols, which are a result of a form of socio-economic development that cause climate change in earth systems. It is now known that this relationship is no longer a linear cause-and-effect one, since climate change can alter GHG concentrations (this is represented in the graphic by two-way arrows). At the next level are the impacts, which interact with both natural and human systems: this second set of interactions has been prioritized, but the impact on ecosystems is still uncertain and has the ability to aggravate climate change deeply. Both mitigation and adaptation interact with socio-economic development: here it is in the human system that both the cause and the consequence of climate change lay. To manage climate change properly, one must understand this interaction between drivers, impacts and responses.

A flexible approach to NAMAs: the case of Peru

Context and data: Peru's contribution to global GHG emissions is less than 0.5%, and its contribution to the emissions already put in the atmosphere in even smaller. 47% of these 2000 emissions come from the Land Use, Land Use Change and Forestry (LULUCF) sector.[1] During COP 14, Peru's Ministry of the Environment offered to stabilize emissions derived from deforestation by 2017. Peru has been consistently ranked among the most vulnerable countries to climate change and has most of the vulnerability conditions listed in the UNFCCC (e.g. costal zones, mountainous ecosystems, forests, air pollution and poverty, among others).

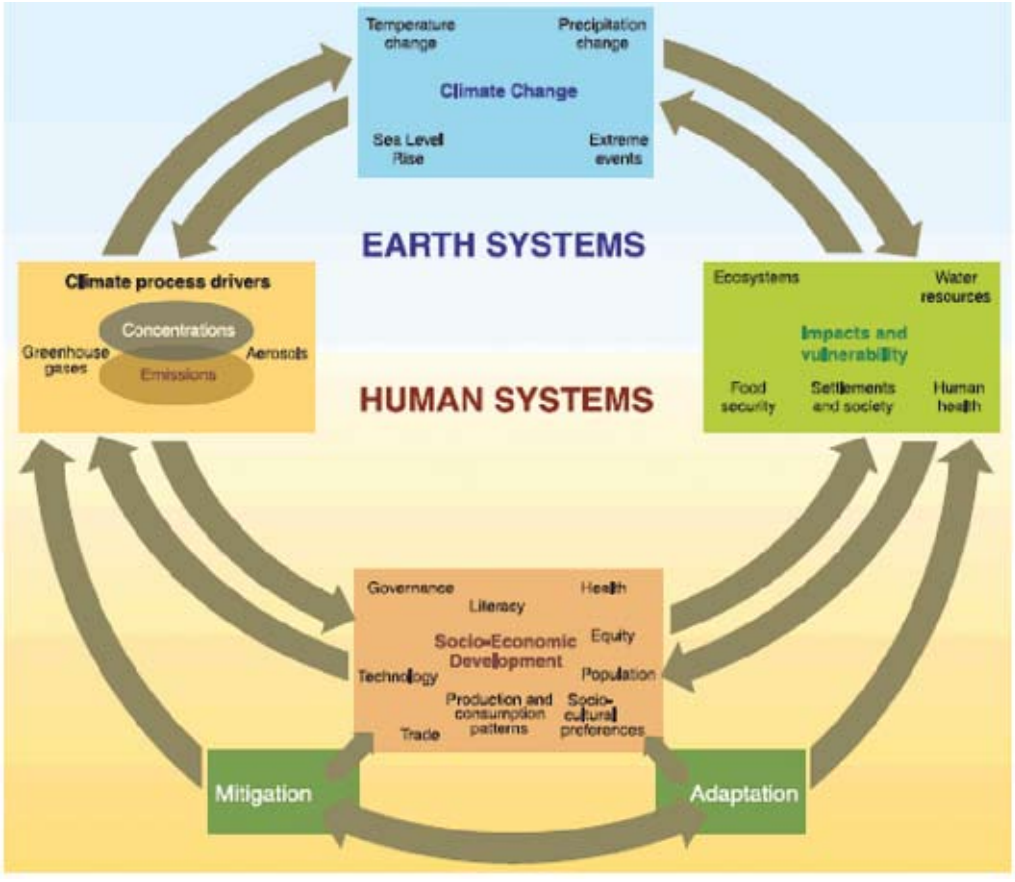
A possible strategy under a flexible approach: Clearly Peru is not a large contributor to GHG emissions, yet its vulnerability determines its climate change priorities: adaptation and ambitious global mitigation. Peru thus *can* and *must* engage in developing NAMAs, not only because, as a Party to the UNFCCC, it has a responsibility to combat climate change, but also because this provides an opportunity for national actions that are low or zero cost and no lose, and that can bring important co-benefits to society. These opportunities exist in many sectors, such as energy, waste management, transport and even construction. These sectors are different in nature and are at different stages of readiness for engaging in mitigation actions. We will give some clear examples of how a flexible approach could work in two of these sectors: LULUCF and waste management.

1) **LULUCF:** The offer referred to above could easily be the main component of Peru's mitigation strategy and would constitute, by definition, a NAMA. Clearly the scale is national, the legal nature is voluntary and finance could come primarily from Annex I financial commitments under the Convention (international public finance) since there needs to be a large component of capacity-building for MRV, among others. Certainly, as part of a National Forestry Strategy, there will also be an allocation of national public funds. Also, if a financial mechanism is put in place for REDD or REDD+ which includes a combination of public and private finance, then these would also be supplementary sources of finance. Forestry CDM could also be included while capacity is built to scale up projects to the sub-national and national levels. A large component of education, training and outreach must be put in place as a crucial part of the NAMA.

2) **Waste management:** The situation in this sector is different: it does not represent a major part of the country's emissions, and its legal situation would probably prevent it from engaging in a national NAMA in the near future. However, CDM projects in this sector have proved to have the potential to develop successfully, and to have important co-benefits for public health. Therefore supplementary NAMAs in this sector could initially be implemented and financed by private sources as project or programme activities under the CDM.

1 Peru's National Inventory, base year 2000.

Figure 2: Inter-relationships between adaptation and mitigation



Source: IPCC. 'Climate Change 2007: Synthesis Report', 2007

Furthermore, even if developing countries decided to engage actively in mitigation, adaptation would still remain their first priority, since this threatens to undermine their development and efforts to alleviate poverty. Therefore adaptation must be considered *when planning* for mitigation. NAMAs can and *should* contribute to effective adaptation in developing countries, which is where the concept of 'climate screening' comes in. Climate screening refers to the consideration of climate change (both mitigation and adaptation) during the planning phase of an activity or investment, or the inclusion of these considerations in an ongoing process or existing institution.

The Peruvian energy sector is a clear example of how taking climatic impacts and adaptation to these impacts into account can influence the decision to implement NAMAs. Focusing only on mitigation would probably result in a decision to expand hydro power generation, since hydro is a renewable energy source with zero emissions. Nevertheless, if studies of vulnerability are consulted, one finds that most water for hydro power generation (and many other uses) in Peru comes

from mountain glaciers, and these are melting away because of climate change. The expansion of hydro power generation could then put at risk the supply of water for agriculture (food security) and human consumption (health).

Conclusion

Countries have a big task and responsibility ahead of them on their way to Copenhagen. It is important, though, to be practical and realize that this task should focus on two main duties. First, countries must consider *what* it is that *must* be agreed in December 2009, and what can be left for further discussion. Secondly and most importantly, each country must play its part in order to build trust between them.

Science shows us that developed countries must take the lead, but also that developing countries must follow. The role of developing countries is to push for a fair agreement and to set clear national priorities to push the developed world to stronger commitment. NAMAs will be the instrument by which these priorities can be set. A balance is needed between flexibility that allows all the national circumstances of developing countries to be taken into account, and deep MRVed GHG cuts that produce environmental integrity.

If they are allowed to develop under a flexible approach that takes adaptation into account, NAMAs can help ease the way by restoring trust. NAMAs can be used as instruments for climate change mitigation, building political will, matching all actions in developing countries with the appropriate support, effective capacity-building in developing countries, and even adaptation.

Let us remember that only trust can lead to empowerment and effective teamwork, and that these are key capabilities that must be developed and strengthened if we want to have a chance of tackling global climate change.

Are we ready to start trusting?

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EXPLORING A SECTOR NO-LOSE TARGET IN THE TRANSPORT SECTOR:

Urban transport in Beijing, China

Abstract
Based on a case study of urban transport in Beijing, road-testing a Sectoral Proposal Template for sector no-lose targets, this paper concludes that this approach would work as a national appropriate mitigation action (NAMA) in China. As such, the paper presents a clear argument for the feasibility of sector no-lose targets for the transport sector. Even more, analysis suggests that this approach may be the best suitable approach for the sector. Experiences also show that sub-sectors, like urban transport, may be promising starting points for national action.

The negotiations over a follow-up agreement to the Kyoto Protocol have entered their final phase. Nationally appropriate mitigation actions (NAMAs) for developing countries have been a central topic in the debate. A multitude of policy-makers and stakeholders have responded to this challenge and have started putting forward suggestions for a general NAMA framework, as well as individual policy instruments that could be put forward by developing countries as a NAMA.

Sector no-lose targets (SNLTs) belong to the class of sector-crediting approaches that are being discussed as a NAMA option. They are seen as one way of scaling up mitigation efforts and one possible path of evolution from the current CDM. Sector no-lose targets are one possible mechanism that can be applied at the sectoral level, at least for some sectors and some (large) developing countries. They can be formulated in such a way that they can be assessed as NAMAs and facilitate matching with corresponding international support.

* This case study has been made possible through the UK FCO Strategic Program Fund. With contributions by Marion Vieweg, Niklas Höhne, Padraig Oliver and Xingyu Li, Ecofys

Geographically, a lot of attention has been focussed on NAMAs in China. This is not surprising given the importance of the country's contribution to future emission reduction efforts. China has been the major recipient of Annex I country financing through the Clean Development Mechanism, but huge opportunities to scale up mitigation still exist. The transport sector has so far not been able to attract much international support for mitigation efforts under the Kyoto Protocol, but new approaches that can be implemented and supported as NAMAs may be an appropriate solution to this problem. Sector no-lose targets may be a more promising option to direct international funding to the transport sector in China than other approaches such as Policy-CDM or Sustainable Development Policies and Measures (SD-PAMs) and are therefore explored further.

CDM has been successful in many sectors of the Chinese economy to reduce the domestic emissions of GHGs and improve energy efficiency. Of the roughly 600 projects registered in China, however not a single one is in the transport sector.

Ecofys and GTripleC developed 'Sectoral Proposal Templates' that aim at facilitating this concept in the proposal stage of a NAMA (Höhne et al. 2009). They combine qualitative and quantitative information on the sector in a structured manner. In this way, the developing country can provide a description of its circumstances at the level of transparency needed to negotiate a sectoral target, negotiate appropriate international support and scale up its mitigation actions to the sectoral level.

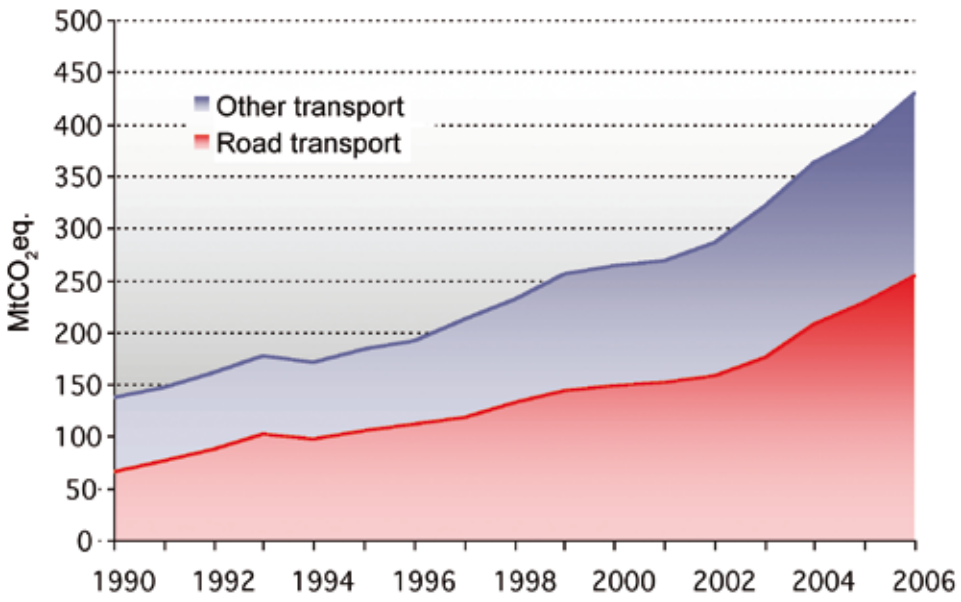
After a first stage in Mexico, we have chosen to test this set of Sectoral Proposal Templates in China. The issues and challenges encountered in this road-testing exercise are set out below, and we discuss the findings of a case study of the Beijing urban transport sector. This is done with a view to giving negotiators a sense of the viability of the policy instrument of SNLTs as a NAMA and its requirements at the domestic (developing country) and international (UNFCCC) levels.

This paper starts with an introduction to the Chinese transport sector, the challenges that it presents and how the Chinese government has been aiming to manage its sustainable development. We then discuss the concept of sector no-lose targets, explore how they fit within the current discussion on NAMAs, how they address the challenges encountered in the transport sector and what tools will be needed to make them work. Finally, urban transport in Beijing is examined as a case study to illuminate how this concept could actually work in practice. We close with some general lessons and conclusions that have emerged from Ecofys' road-testing exercise in the transport sector, carried out in cooperation with the Chinese Energy Research Institute.

Managed growth in the Chinese transport sector

The Chinese transport sector has grown tremendously in the past three decades. Following the opening up of China's economy, the transport of goods has exploded. Car ownership and air travel have become affordable to tens of millions of people in developed urban areas, and they symbolize economic success and a new freedom for

Figure 1.



Growth in the Chinese transport sector (source: adapted from IEA 2008).

hundreds of millions more. 1,200 cars are being added each day to the streets of Beijing alone, and the number of passengers on commercial planes grew more than tenfold from 1990 to 2007 (China Statistics Press 2008).

China has followed the industrialized world in the use of fossil fuel-based modes of transport. With the strong growth in the use of combustion engines come rises in emissions of greenhouse gases (GHGs), most importantly carbon dioxide. China is far behind the US when it comes to GHG emissions from the transport sector, but its share is growing quickly. Transport contributes 28% of total GHG emissions in the United States, and in China 5.4% of GHG emissions were already being emitted by transport activities as of 2006, more than triple the 1990 emissions (see Figure 1). This excludes the indirect emissions of electric-powered trains and urban transport, which use electricity generated mostly in coal-fired power stations.

Local emissions of SO_2 and particulates have become a significant problem for urban areas. Since many industrial installations that were traditionally located in or near cities have been moved to the countryside, the transport sector has become the largest contributor to urban smog. The drastic measures that the city of Beijing took to provide an acceptable environment for the Olympic Games in 2008 demonstrates the adverse health effects of the local pollution, which originates largely from cars, etc.

The Chinese government has adopted ambitious measures to improve energy efficiency and reduce local pollution from the transport sector.

Measures include provisions to expand high-speed railways greatly, as well as public transport in urban areas. Market-based mechanisms like fuel taxes are not yet widely applied, but China has adopted a strict timetable to phase in fuel efficiency standards for vehicles (NDRC 2008).

The Clean Development Mechanism (CDM) has been successful in many sectors of the Chinese economy in reducing the domestic emissions of GHGs and improving energy efficiency. Of the roughly 600 projects currently registered in China, however, not a single one is in the transport sector. One project under development in Chongqing focuses on an urban rapid-transfer bus system. Globally, only two projects have been registered in the transport sector so far (UNEP Risoe Centre 2009). The CDM generally favours large, single-point emission sources, where emissions can be clearly attributed and calculated. Consequently, one methodology has been approved for the transport sector so far. Whereas applying for a CDM project is already a tedious task, with high transaction costs in the case of renewable energy power generation or emission reductions in industrial installations, the challenges become close to insurmountable in the transport sector. The existing methodology so far only covers rapid-transport bus systems, and another small-scale methodology has been applied to motorbikes. Their wider application for private transport, air travel or the transport or shipping of goods is not proven, and few new methodologies for these areas are under development (UNFCCC 2009).

Sectoral approaches for emissions reduction have received considerable attention in recent years ….. They are seen as one way of scaling up mitigation efforts and one possible path of evolution from the current CDM.

Policy CDM could be one alternative to the current CDM for these cases. In this variant, emission reductions that result from the introduction of a new policy (e.g. a fuel economy standard or fuel taxes) are credited in the form of certified emission reductions (CERs) to the agency implementing the policy. However, as it is difficult to set an appropriate baseline and causally attribute observed emission reductions directly to any one explicit policy, the use of Policy CDM has so far not been permitted under the Kyoto Protocol.

The question is, then, how can further advances in the Chinese transport sector be recognized and supported internationally as nationally appropriate mitigation actions? Administrative measures have already moved carbon dioxide emissions in the transport sector away from what would have happened in their absence. And they are clearly nationally appropriate, as the Chinese government has undertaken them in the light of domestic energy constraints and to reduce local air pollution. As such, they could be framed as sustainable development policies and measures (SD-PAMs), a mechanism proposed internationally to acknowledge developing country efforts that have a large sustainable development dividend while at the same time reducing greenhouse gas emissions. However, in light of the pressure that may be placed on China to agree to measurable, reportable and verifiable (MRV) actions in Copenhagen, the use of SD-PAMs may be seen as too weak, as the quantification of and constraints on emissions are not major elements of this approach.

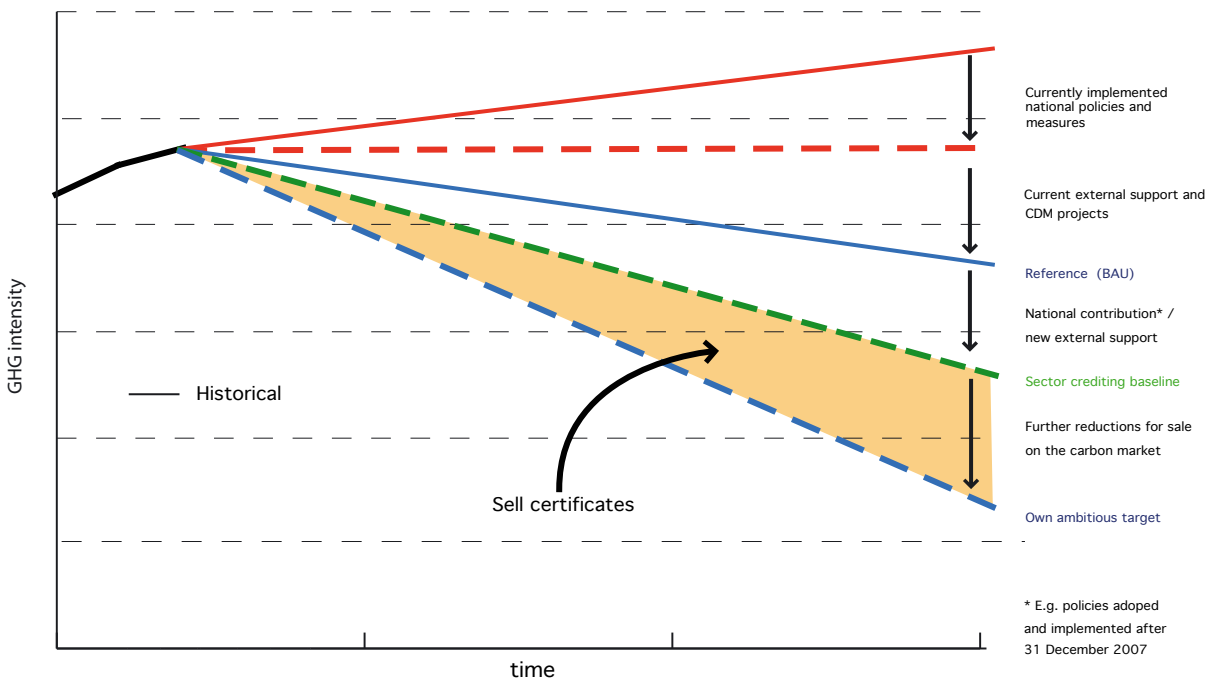
Sectoral no-lose targets as a solution?

Sectoral approaches for emission reductions have received considerable attention in recent years, and they are on the list of issues that have been discussed under the Bali Action Plan agreed in December 2007.

Sector no-lose targets are a form of non-binding emission target that encourage sector-wide emission reductions. Developing countries voluntarily propose a sector crediting baseline (most likely in the form of an emission intensity for the sector in question) which is negotiated at the international level. Reductions below the baseline generate credits issued to the government, but no penalties occur if the target is not met for the whole sector. Sector crediting baselines are negotiated and set separately for each major sector and country.

As depicted in Figure 2, the sector crediting baseline is an emission intensity level for the whole sector that is lower than the reference scenario (dark blue). The reference scenario is calculated to include currently implemented national policies and measures, as well as current external support and CDM projects that are already running. As an important element, this approach also includes a national contribution in the form of emission reductions, making it a real mitigation mechanism that goes beyond the offsetting of Annex I emissions. It may be supported by new international finance. The reductions between the sector crediting baseline (dashed green line) and the achieved emission intensity level, multiplied by units of output, can be sold as emission credits on the international carbon market.

Figure 2. Concept of sector no-lose targets (Ecofys/GtripleC).



The crediting baseline for a sector no-lose target is negotiated at UNFCCC level, ideally at the same time as developed country targets for post-2012 are being agreed. In this way, additionality could be ensured up-front by linking the demand for reductions from developed countries with the supply in credits by hosts of sector no-lose targets. The international community needs to create rules for linking this option and the emission certificates it creates in developing countries to the emissions trading systems in developed countries.

Sector no-lose targets are a form of non binding emission targets that encourage sector-wide emission reductions. Developing countries voluntarily propose a sector crediting baseline (most likely in the form of an emsission intensity of the sector in question) which is negotiated at the international level.

As the income from the sale of emission credits accrues to the government, it in turn has to pass on the incentive to the companies and/or emitters at the sector level, either directly or through its own choice of policy. This allows for an approach that is tailored to the country-specific situation, and in particular it qualifies it as a NAMA. Governments may chose to employ administrative measures, taxes, subsidies or locally limited emission trading schemes to facilitate emission intensity reductions.

To return to the Chinese transport sector, we identified above a number of measures that the country is already undertaking which have a greenhouse gas mitigating effect. The causal contribution of each individual measure is hard to determine, and the reductions are difficult to measure at each individual source – i.e. the effect of individual measures on emissions is not easily MRV-able. But if China voluntarily committed itself to a sector no-lose target in the transport sector, monitoring, verification and reporting at the international level could focus on the (over-) achievement of the target as a whole. The individual effects of domestic actions that have led to the reduction of the emissions (intensity) compared to the agreed sector no-lose target are then of no concern to the international community. Applying a sector no-lose target enabled by new additional finance and linked to the international carbon market could be considered a NAMA in itself.

For the transport sector, the basic sector no-lose target approach may be most viable where the income accrues to the government, which then incentivises reductions in the national transport sector. Another option for this approach in other (industry) sectors would be to move the incentive structure from the national to the company level and let companies profit directly if they beat the intensity baseline. It is, however, presently unclear how this option could be integrated into the current climate change regime under the UNFCCC (Ward et al. 2008; Baron et al. 2009; Schneider and Cames 2009).

One basic precondition for the implementation of a sector no-lose target is that the historical data used are detailed and credible and the observed situation of the sector can indeed be monitored, reported and verified. This is to ensure firstly that the assumptions on which the reference scenario and the crediting baseline are set are viable. Secondly, it is to warrant the correctness of the emission reductions claimed by the government during the commitment period.

The validity of the targets and the MRV process is the basis for the integrity of sector no-lose targets as a NAMA, and this in turn depends a lot on the availability and quality of data in the country and sector and their transparent presentation.

Starting this process in the first instance, a key issue becomes how developing countries will prepare their proposals for sectoral crediting baselines so that they

- can be understood by the other countries in the process;
- will be seen as a credible starting point with the right ambition level; and
- provide a means to negotiate them through analysis of specific underlying elements and drivers.

Ecofys and GTripleC have developed 'Sectoral Proposal Templates' that aim to facilitate this proposal stage (www.sectoral.org). The concept of these templates is systematically to step through all the elements that are necessary to understand what a reasonable crediting baseline might be for the sector in question. These elements are obviously of a technical, social and economic nature and are very sector- and country-specific. Moreover, given that a crediting baseline is essentially a projection for a future multi-year period, it will be important to understand the current trends in emissions and associated dynamic 'metrics' for the sector and drivers for these trends.

By combining qualitative and quantitative information on the sector and the relevant circumstances in the country in a structured way, the templates provide the maximum level of transparency necessary for the negotiation of a sectoral crediting baseline at the international level. This kind of assessment is the key to formulating sector no-lose targets as a country NAMA.

The templates have been road-tested in Mexico and more recently in China. The goal of this road-testing is to improve the understanding of the concept of sectoral crediting baselines and to learn about data availability and data collection needs. A revision of the templates will take into account the lessons learned from the road-testing phase. So far, three sectors have been covered: cement, electricity and transport. The transport template in particular has profited from the experience in Mexico and has been updated considerably for the second road-testing phase in China.

The yet to be developed MRV process of sector no-lose targets and NAMAs in general is likely to benefit from the experience gained by testing templates for the *proposal* stage of sector no-lose targets. Similar tools need to be developed for the later MRW stage to present information on sectoral mitigation achievements of a developing country and the adequacy of the funding it is receiving from developed countries. The advantage of the sector no-lose target concept with regard to MRV is that it is the achieved emission intensity of the sector compared to the crediting baseline that needs to be MRVed, not the individual measures (e.g. policies, standards, internal trading, subsidies etc.) that have led to the decrease in intensity.

Case study: Beijing's transport sector

The expansion of transport activity has been most pronounced in China's urban regions, resulting in a great increase in personal mobility, as well as negative environmental impacts. Administrations in all large cities have made efforts to

manage transport expansion in their administrative regions, and they enjoy considerable freedom to steer development in this sector in their preferred direction. Beijing's transport planning has received significant attention in the wake of the Olympic Games and as the capital and one of the largest Chinese cities. Instead of going to the national level directly and covering the transport sector of the whole country, for which less reliable detailed data are available, it was therefore a good choice to focus on the Beijing municipal region to road-test the transport sectoral template.

One basic precondition for the implementation of a sector no lose target is that the historical data used is detailed and credible and the observed situation can indeed by monitored, reported and verified.

This focus on Beijing implies a number of choices regarding the boundary, that is, what we mean when we talk about the transport sector. Transport that goes beyond the geographical area of Beijing municipality has been excluded on the grounds that emissions would be difficult to attribute. This refers to aviation, railway transport, transport on waterways and inter-province/city highway transport apart from the portion that occurs in Beijing municipality. In effect, we chose to test a sector no-lose target for urban transport. The adapted template could then be applied in any given urban area.

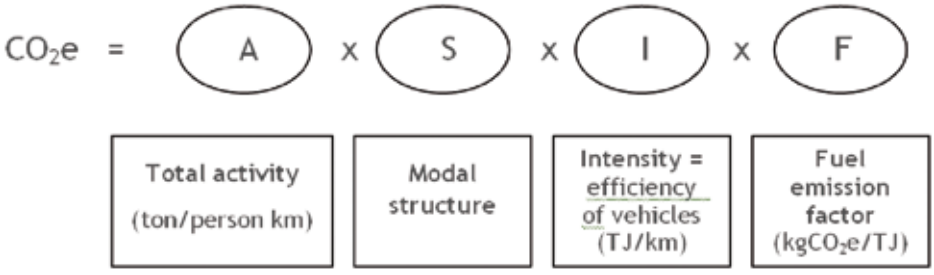
In developing a proposal template, it is necessary to balance the need for detail and separate clearly distinguished transport modes with the general goal of reducing complexity and providing an overview that is easily understandable. Transport is therefore split into

- road-based freight transport,
- private vehicle passenger transport,
- public (passenger) transport running on fossil fuels, and
- public (passenger) transport running on electricity.

Boundary issues still persist with respect to including certain new transport modes that exist already or that might become an important option in the future. Electric bikes are becoming more popular in China, and studies have shown that they are low on energy consumption and pollution. However, they are not included in the boundary because of the complexity of collecting data on the amount of electricity used to charge the batteries. Similarly, the scenario assumptions for the future do not yet consider electric cars. Eventually, these new modes of transport will have to be included so as to account for all mitigation efforts in the transport sector when proposing a no-lose target for the sector as a nationally appropriate mitigation action.

Data availability in Beijing can be considered good overall compared to other cities or provinces in China. This is a key prerequisite to be able to MRV the given approach as a NAMA. Most of the historical data can be taken directly from the Beijing Transport Development Annual Reports, Beijing Statistical Yearbooks and China Energy Statistical Yearbooks. Additionally, previous studies, projects and modelling exercises on Beijing's transport sector have proved to be constructive sources for providing supplementary data. However, data exist mostly in aggregate

Figure 3. ASIF methodology as implemented in the calculation tool.

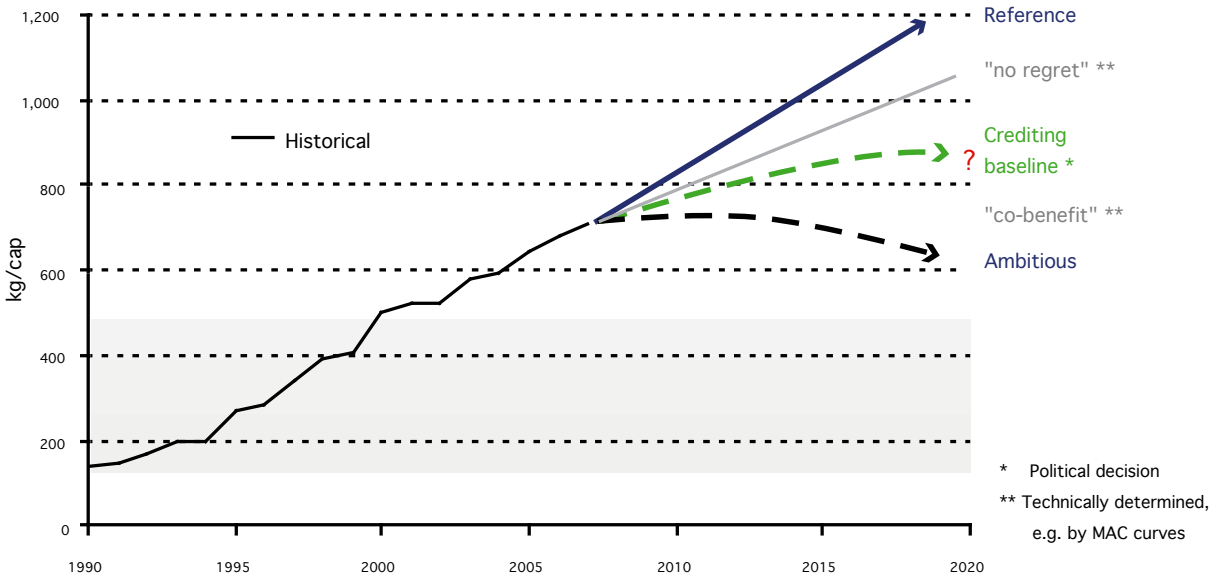


form only, and the energy use of specific large consumers, such as the departments operating the public bus system or taxi companies, is not monitored comprehensively or specifically identified. One particular further problem is that gasoline and diesel for use in commercial or government vehicles is often purchased in bulk and not distributed through regular gas stations. These are just a few of the issues surrounding data availability and integrity that would need to be adequately addressed before a sectoral target could be formulated capable of withstanding the scrutiny of an international MRV process.

One important point to note is that a lot more information is needed to develop a sector no-lose target proposal than merely information on total sectoral emissions. In order for the scenarios to be transparent, they are based on assumptions regarding transport activity, modal structure, the efficiency of vehicles and fuel emission factors. This allows for the scenarios to be different based on choices regarding these factors. For example, the reference (BAU) scenario might assume that 50% of all passenger transport (person km) happens on public transport, while a more ambitious scenario assumes that 70% public transport can be achieved. The actual target that is ultimately set through negotiations at the international level can then be easily compared to future performance as observed and expressed directly in terms of GHG emissions (intensity).

We assessed the trends in historical energy consumption and distance travelled for passengers and freight from 1990 to 2007. The data provide a basis for assumptions on travelling activity, transport modal structure and vehicle efficiency in the three scenarios underlying a sector no-lose target. Figure 3 shows the data that have to be taken into account, and that therefore needs to be provided as an input, to develop an understanding of the possible developments in the sector. The data used to calculate total activity for example, include statistics per transport mode on average travelling distance per passenger, total annual passenger numbers, average load per vehicle and so on. Data on vehicle efficiency are not available from direct sources but are derived from previous studies relating to Beijing municipality. The availability of such information or the ability to generate it is a prerequisite to develop a transparent, MRV-able proposal for sector no-lose targets as a NAMA.

Figure 4. Concept of political baseline setting based quantitative information.



Scenarios calculated using the IPAC-AIM/technology model, which was developed by the Energy Research Institute under the National Development and Reform Commission of China, are used to inform the assumptions needed to complete the proposal template. The IPAC model addresses energy consumption and pollution under the conditions of future population and economic development. It particularly focuses on the impact of transport policy on emission mitigating actions. Using a quantified methodology, the framework of the model looks at the following elements:

- Future trends in population and economic development;
- Estimated transport demand based on Beijing's economic development trend; derived future passenger and freight travelling distances and vehicle numbers;
- Factors that influence scenario settings under different policy conditions: efficiency changes in vehicles through technological advances, market share by type of vehicles and change in fuel mix;
- Quantified analysis of future energy demand and CO_2 emissions in Beijing;
- Policy advice based on model analysis.

An important issue in the scenario setting is which policies should be included in the reference scenario and which go beyond. The year

2007 was chosen as the policy base year, meaning that policies and measures that came into effect before the end of 2007 would be included in the business-as-usual scenario, while new policies and measures introduced after 2007 influence the scenario used as crediting baseline (see Figure 2).

This means that the following activities that the Chinese government has undertaken in the transport sector nationally and in Beijing before 2007 fall under the business-as-usual scenario:

- Fuel economy standards for small passenger vehicles;
- Energy development and conservation planning for Beijing in the 11th Five-Year Plan (FYP);
- Beijing transport development framework;
- Beijing infrastructure development for the 11th FYP;
- Limitation on inefficient small passenger vehicles;
- Future planning for rail transit in Beijing.

No external support in the form of CDM has been received in the transport sector.

New policies and measures after 2007, which can be considered China's national contribution and which should be supported with new external support, include:

- New vehicle emission standard;
- Wholesale oil price reform;
- Traffic restrictions indexed by weekday/licence plate numbers;
- Adjustment on car sales tax;
- Subsidy on efficient and new energy cars;
- Revitalisation plan for the automotive industry.

The question of what metric to use in the scenarios has come up during the road testing and in the consultations with stakeholders. In general, the idea of the no-lose target has been to use a calculation based on intensities, for example, CO_2eq. per ton of cement or kilowatt hour. As the road testing in Mexico showed, a metric like GHG emissions per person kilometre or similar is not viable because verifiable data in kilometres travelled is not available. So the Beijing exercise started out by exploring emission intensity from transport per capita and per GDP of Beijing municipality. Both options appear viable, but even an absolute no-lose target could be acceptable. This is due to the ambitious planning for sustainable transport in Beijing, and more generally because space constraints naturally limit the expansion of fossil fuel-based private transport in the urban region. Unlike other industries like cement and iron and steel, there is less concern that an absolute target will limit the expansion of the sector.

In the end, the exact absolute or intensity level at which to set the target, that is, the sectoral crediting baseline, is always a political decision. It needs to take into account how stringent and ambitious existing policies are, how much financing can be provided to implement them, what the maximum mitigation potential is, etc. If sectoral analyses regarding marginal abatement costs (MAC) exist, they may be used to inform this pro-

cess. It is likely that an argument can be made for the sectoral crediting baseline to be placed at some point in between a 'no regret' cost line, covering measures that have no or negative costs to implement, and a 'co-benefit' level, including measures which entail substantial other positive environmental or development benefits (see Figure 4). For the Beijing transport template road testing, an in-depth analysis based on a sectoral MAC curve has not been undertaken due to a lack of data. Using MAC curve information can be the key to presenting a convincing case for a specific sectoral target. In the transport sector this may nevertheless be difficult because a large part of the cost might be borne by individuals, and benefits are largely available to all of the public in the form of positive environmental externalities.

To present persuasive scenarios for the transport sector, stakeholders must be adequately involved and given the opportunity to provide input. At the current stage, the road testing has been carried out as a research project, with the information used coming mostly from a central government research organisation. Local government agencies have been consulted and have been involved in the collection of data as well as in planning the general direction of future scenarios.

City planners in Beijing have extensive experience of mapping out and implementing sustainable strategies for city transport. In the past this has been realized mostly with a view to solving the problems of congestion and localized pollution. Low carbon development has become a hot topic among politicians at all levels of government in China, but it is still a relatively new idea and has not been an independent goal for the urban transport strategy of Beijing. Taking up a sector no-lose target in Beijing's transport sector would mean that sustainable transport strategies that are being implemented or planned today (expansion of mass public transport, vehicle efficiency standards, fuel taxes, etc.) can continue to be used and made more stringent. In addition, each policy would be mainstreamed to concentrate on the most effective ways to mitigate carbon dioxide emissions and new measures be devised to further this overarching goal. To assess the success of the NAMA in the transport sector, it will then not be necessary to look at each measure individually, but at the overall deviation of transport emissions from the sectoral crediting target that has been agreed *a priori*.

Following this logic, the choice of an implementing and supervising organisation that promotes mainstreaming of the GHG mitigation goal in the transport sector becomes vital. Beijing city will need the capacity to

- present a compelling case for a crediting baseline using the proposal template;
- implement ambitious policies and measures that go beyond the status quo and have a GHG mitigation objective at their heart;
- ensure that the crediting baseline is actually crossed to generate income from the sale of emission credits on the international carbon market;
- ensure that data quality and presentation meet the requirements of the international MRV process; and
- use the projected income stream and other available international finance to incentivize mitigation measures adequately.

As becomes obvious from this list, the challenges for the actual realization of a no-lose target in the Beijing transport sector are considerable. Achieving the target will require the coordinated efforts of the Beijing Development and Reform Commission, the Statistical Bureau, the transport and urban planning agencies, research institutions, the National Development and Reform Commission, the Ministry of Transport and probably a number of other entities. It should be noted, however, that the challenges mostly concern the presentation and harmonization of sectoral efforts – the actual policies and measures that are needed can continue along the lines already practiced today, as only the sector no-lose target would be presented and evaluated internationally as a NAMA.

Conclusions

The road-testing of the proposal template for a sector no-lose target in the Beijing transport sector has shown that it would actually be possible to implement such an approach in China, at least within the boundaries chosen for this particular case study. It has become clear that the capacity to provide and present the necessary data still needs to be further enhanced to a level that can withstand the scrutiny of an international MRV process. Issues surrounding the coordination of efforts to reach the target, as well as the use of the possible income from the carbon market to incentivise emission reductions, deserve much more attention and should be the focus of future research efforts, for example, through a pilot study.

While in other sectors there have been doubts as to whether an approach is feasible that allocates income from the carbon market to a government (not private) actor, this research clearly demonstrates that this is the preferred and probably only option in the transport sector. The large number of dispersed emission sources is just what makes other approaches like the CDM, which rely on the incentivisation of reductions at each individual source, impractical. Furthermore, nearly all present reduction efforts in the transport sector in China today rely on administrative measures like the setting of standards and the expansion of mass public transport, etc., which can be further enhanced with additional financing.

What, then, does the case of urban transport in Beijing tell us about the applicability of sector no-lose targets for the transport sector in general in other big (Chinese) cities, and do they have a wider application beyond the metropolitan regions? Data on the transport sector in big Chinese cities exist in differing qualities. The argument has been made above that data availability and quality and the capacity to analyse and present them are indispensable for proposing a sector no-lose target. If the approach should be applied more widely, preparing cities' ability to cope with these challenges should therefore be one of the primary concerns of capacity-building efforts. Through the Chinese governance system, and provided sufficient funding is available, it should be possible to spread experience gained in pilot projects and more advanced cities to others, replicating institutions and incentive structures.

To present sectoral targets as a NAMA, it may be reasonable to consider transport by dividing it into distinguishable sub-sectors. Urban transport and the policies and measures for reducing GHG emissions are considerably different from the questions that arise when one thinks of intercity transport, including not only road transport, but also aviation and water-based transport of both passengers and freight.

One sub-sector could therefore be urban transport, for example, covering all the cities in China above a certain size, applying the transport mode boundary used in our case study. Although the sector no-lose target would in this case exist in cities spread out across China, concerns over leakage are unlikely to arise because urban transport cannot be replaced by inter-city transport. Policies in large cities with a target that supports the development of mass public transport are also unlikely to cause inhabitants to move to other, smaller cities that do not need such a target. Vehicle efficiency standards put into place to reach targets in the cities effectively also extend to inter-city road transport, as manufacturers will not offer separate models. The Chinese government could take up an absolute or intensity target for transport in all cities above a certain size, and one could even imagine the setting of a benchmark expressed in terms of per capita emissions in the transport sector, which makes the achievements of cities comparable and helps in reaching the overall national target.

The case study presented here allows few conclusions for the sub-sector of either inter-city (here especially freight) or rural transport. The discussions surrounding the former might, however, be partially informed by the debate surrounding international aviation and maritime emissions.

The transport sector as analysed here is quite distinct from other sectors such as cement, iron and steel production and power generation, where other case studies have been or will be carried out. However, one other sector with a major share in global emissions that may be able to apply the lessons learned through the transport case study is the building sector. This shares important characteristics with the transport sector: it has a large number of dispersed emission sources where individual emission reductions are impossible to incentivise directly, leakage and competitive concerns are minimal, and there is a reliance on administrative measures like standards and public spending to realize energy efficiency gains. Further research could therefore also be directed at developing a sectoral proposal template for the building sector and analysing more generally questions of the domestic implementation of sector no-lose targets as a NAMA in both these sectors.

Experience from the road testing exercise underlines once more that data analysis can only be a starting point in formulating a sector no-lose target as a NAMA. Data availability, information on cost, etc. are certainly important issues, but in the end the setting of the no-lose target, the sector crediting baseline, remains a political decision. It has to be taken with a view to the specific circumstances of the country and sector, and by matching the level of ambition of the NAMA with the level of international support provided.

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NAMAS FOR DISPERSED ENERGY END-USE SECTORS:

Using the Building Sector as an Example

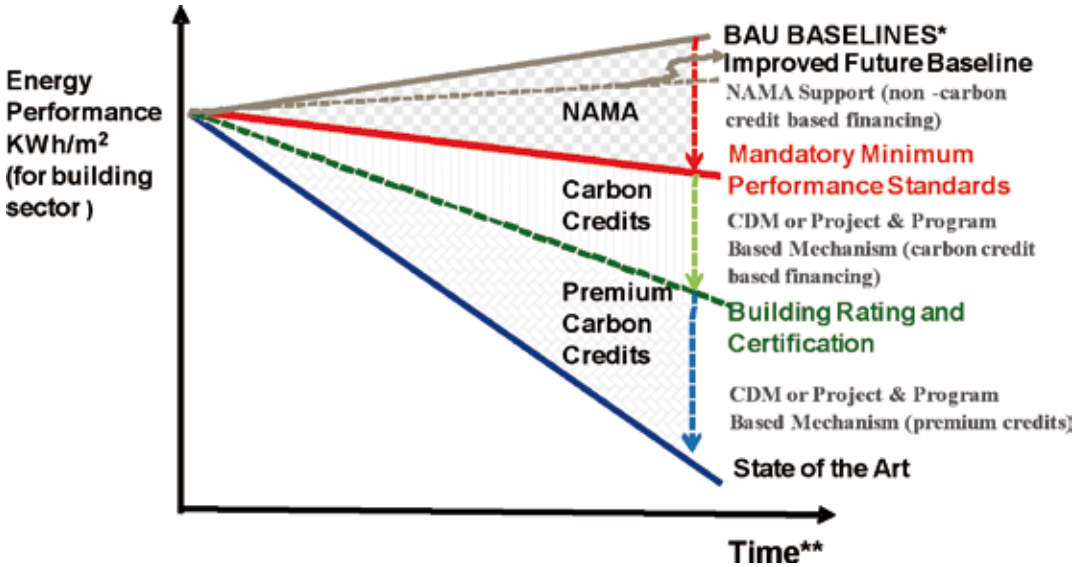
Abstract

A new approach for a Nationally Appropriate Mitigation Actions (NAMA) framework is presented to unlock the enormous potential for low-cost greenhouse gas emission reductions in the dispersed energy end-use sectors in developing countries. The framework is designed to fulfill the demand for public policies and public sector investment in developing countries and thereby boost private sector investment through project/program based market mechanisms, such as the Clean Development Mechanism (CDM) and Joint Implementation (JI). The new NAMAs framework is a need-based mechanism which more effectively considers the conditions of each developing country. The building sector is used as an example to demonstrate how NAMA measures can be registered based on the circumstances that exist in each country. The capacity building, financial, and technology transfer/development[1] support from developed countries are financed as NAMA programs to assist the design and implementation of their registered NAMA package.

In the series of negotiation sessions leading to COP15 in Copenhagen, NAMAs are one of the main focuses of the negotiations and have the potential to become a new mechanism to support mitigation efforts in developing countries. As outlined below, a new NAMA framework developed and presented in this paper would be appropriate and operational for dispersed energy end-use sectors in developing countries, in particular, the building sector and the industrial sector. These two sectors make up the largest portions of energy consumption in developing countries and are characteristically dominated by enormous dispersed energy end-use activities in developing countries. Because of their dispersed nature and various barriers, the current Kyoto Flexible Mechanisms are under-utilized in the two dispersed end-use sectors. In developing countries, the building and industrial sectors are typically the most difficult sectors for government policies to tackle and are in great need of capacity-building, as well as technological and financial support in the post-2012 regime. If designed appropriately, NAMAs implemented in these two sectors could make the widest and strongest impacts in the transformation to a low-carbon society in developing countries.

1 Technology transfer and technology development are used interchangeably in this paper. It includes technological assistance for research, development, adoption, and dissemination of climate friendly technologies, whether the technology is developed locally or internationally.

Figure 1. A NAMA financing framework developed to interface non-carbon credit-based NAMAs and carbon credit based-financing for the building sector (as well as the industrial end-use sector)



Note: * Several baselines and benchmarks may be established for use in building sub-sectors. The baselines and benchmarks could be determined by building end-use types, climate zones and energy types, etc.

** Minimum performance standards and crediting benchmarks are tightened over time, could be negotiation-based or voluntarily determined by countries, or a combination of the two.*** For the industrial framework, energy performance could be measured with kWhe/output or GJ/output). The baselines and benchmarks could be determined by process systems, technology types, production size (output levels), etc.

The approach presented here builds on the Sector No Loose Target idea (Ward, 2008). However, NAMA activities are *not* intended to be financed based on carbon credits. In the NAMA framework illustrated in this paper, benchmarks to determine NAMAs and carbon financing are entirely energy performance-based (see Figure 1). The upper part of Figure 1 shows energy performance improvement and consumption reduction due to various NAMA policy support activities, which is supported by a separate financing mechanism that will be described later in this paper. The lower part of Figure 1 shows further improvements beyond minimum performance standards which could continue to be supported by the CDM or an improved project/program-based mechanism of the sort that are under discussion through the United Nations Framework Convention on Climate Change (UNFCCC). In other words, greenhouse gas (GHG) reduction in a sector starts with a sector-wide NAMA-supporting mechanism. If and when the project developers decide to construct their buildings (or design their manufacturing units) beyond the mandatory minimum performance standards, the additional reduction could create carbon credits and receive carbon finance from the CDM. In addition, premium carbon credits are awarded above a certain benchmark to reward entities who are taking further steps to achieve state-of-the-art technologies, where mitigation costs are often much higher. The same framework also applies to the industrial

sector: only the energy performance could be measured with kWhe/output (or MJ/output).

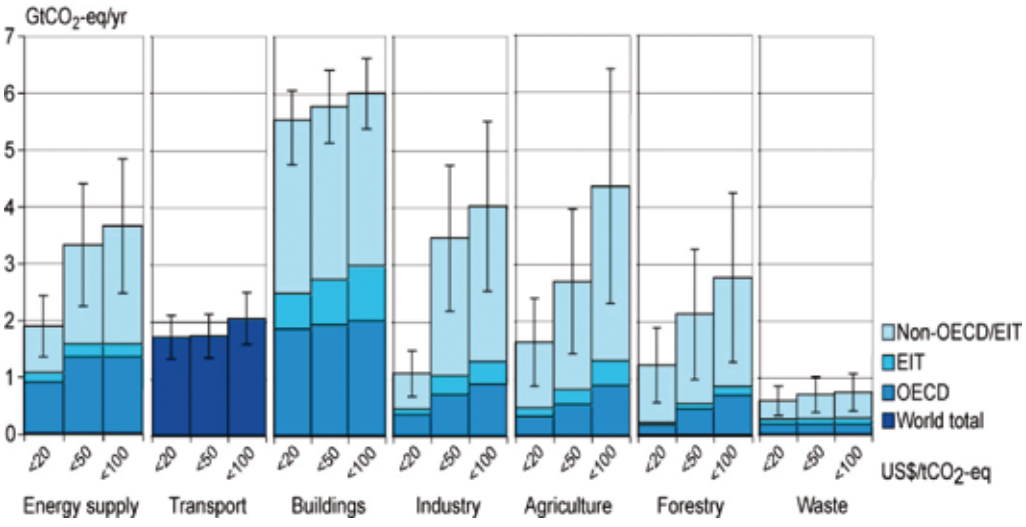
The paper first provides a brief analysis of the characteristics of dispersed energy end-use sectors. Secondly, the paper explains the multiple barriers and market failures that hamper investment in dispersed energy end-use sectors followed by a brief discussion and an overview of policy instruments that could be used to eliminate these barriers. Next, it is pointed out that these policies and measures, which are the key to overcoming barriers, should be designed as NAMAs and implemented in developing countries with financial, capacity-building and technological support from developed countries. Some examples are provided for such NAMAs in the context of the building sector, it being explained that success indicators, not greenhouse gas emission reductions, should be used as the basis for the MRV of NAMAs. Finally, the paper comes to the conclusion that a NAMA framework of this kind can provide the urgently needed solution to global climate-change negotiations.

Characteristics of dispersed energy end-use sectors

The dispersed energy end-use sectors discussed in this paper mainly include the *building sector*, which is the largest energy end-use sector, and the *industrial sector*, which consists primarily of SMEs in developing countries. The two end-use sectors contribute the largest shares of energy end-use in today's economy.

The energy saving and emission reduction potentials from these two sectors are substantial. According to the Intergovernmental Panel of

Figure 2: Potential emission reductions in different sectors in 2030 as a function of the cost assigned to reduction measures (US$/tonne of CO_2 equivalent)



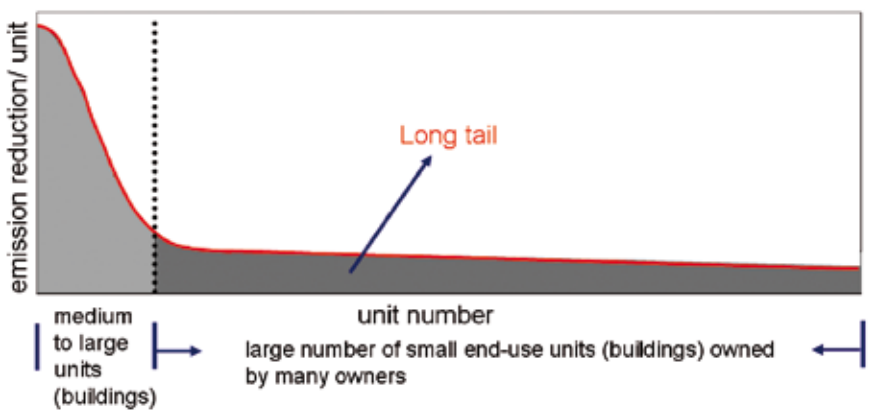
Source: IPCC 2007, Mitigation - Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, p 10

Climate Change (IPCC), the building sector has the largest potential for achieving low-cost emission reduction (< 20USD/tCO2e) in developing countries in the years to 2030 (see Figure 2). Of all sectors, the industrial end-use sector in developing countries has a larger GHG of all sectors emission reduction potential than that of the energy supply sector. After the building sector, the industrial sector potential is only smaller than that of the agricultural sector where methane is the primary GHG -which is a much more potent GHG compared to carbon dioxide (CO_2). Therefore, in terms of reducing CO_2 emissions and its associated fossil fuel consumption, the building and industrial sectors present the largest opportunities. In developing countries, the building sector and industrial energy end-use sectors are intimately related to sustainable development because they are closely linked to the lifestyles of the people and the development progress of the country. However, emissions from the building and industrial energy end-use sectors are difficult and costly to tap. Thus, the huge potential in the two sectors is relatively difficult to realize due to a variety of barriers.

A large share of human activity takes place in buildings. Based on their uses, buildings can be classified into residential, commercial and public buildings. Energy is used in buildings to satisfy a wide variety of functions – to keep the room temperature at a comfortable level, for lighting, cooking, water heating, and to provide electricity to power various electrical appliances. Commercial buildings and public buildings can be further categorized into subtypes like schools, hospitals, departments, hotels and office buildings. Depending on its purposes and location, the energy consumption pattern of each building type is different. The climate zone in which a building is located determines the cooling and heating needs of the building.

The dispersed nature of buildings and SME industries has been recognized and described by some energy end-use CDM researchers as 'long-tail'

Figure 3. Large aggregated savings and emission reduction potential from large numbers of end-use units in the long-tail section of the building and industrial sectors.



Source: Cheng, et al. (2008)

characteristics (Hinostroza, et al. 2007, Figueres and Philips, 2007, Cheng, et al., 2008). Energy end-use in buildings and industrial SMEs present distinct characteristics of dispersed end-use patterns in terms of location, adopted technologies, size, stakeholder's knowledge and technical capacity, end-use conditions, and stakeholder and end-user's decisions. Since a large number of activities occur at the tail-end, the aggregated energy consumption, and therefore the energy saving potential, often outweigh the potential from large-scale projects (Hinostroza, et al. 2007, Cheng, 2008). Moreover, the measures needed to spur actions from the building and industrial sectors require the involvement of a substantial number of stakeholders and actors across all sections of the country's economy.

Energy efficiency in dispersed sectors is out of reach of existing CDM

Despite the enormous potential for low-cost emission reduction in the building sector, the CDM has so far failed to channel large amounts of private investments into this area. Among the 4673 CDM projects that have been registered or were still in validation as of the end of September 2009, there were only 21 projects for energy efficiency improvement among households and another 17 for energy efficiency improvement of the service sector (UNEP Risoe CDM Pipeline dated 1 Oct 2009). Together, these 38 projects accounted for less than one per cent of the existing CDM projects. In industries, only 249 small-scale projects qualified for energy end-use improvement, compared to 474 projects from large manufacturers (UNEP Risoe CDM Pipeline dated 1 Oct 2009).

Some recent developments in CDM could partially address these barriers through the introduction of programmatic CDM, under which a coordinating/managing entity from the public or private sector can set up a program (called PoA) to coordinate the participation of many actors in emission reduction. Once the PoA is established, activities can be included in the PoA and be registered on a fast track. Programmatic CDM is designed to stimulate mitigation actions among dispersed energy end-users such as using Compact Fluorescent Lamps (CFLs) to replace inefficient incandescent lamps. Since the CDM Executive Board (EB) established the rules about programmatic CDM in mid-2007, fifteen programs have been submitted worldwide, and one of them has been registered. It can be expected that once the greatest uncertainty of the post-2012 carbon credit-based mechanism has been solved, more PoAs will be submitted from the developing countries.

The NAMA framework is a need-based mechanism which effectively considers the conditions of each developing country.

However, there is limitation *to* how much programmatic CDM could spur sectoral-wide actions in long tail sectors. Due to strong barriers occurred in the dispersed end-use sectors, which will be discussed later, programmatic CDM alone cannot overcome all barriers and stimulate a systematic uptake of emission reduction activities. A recent UNEP report on CDM and the building sector (Cheng, et al, 2008) also concluded that project-based or program-based mechanisms are not sufficient to scale-up action in developing countries: government policy is the main mechanism to foster transformation in the building sector. However, project and program-based mechanisms are good *bottom-up* private-sector

mechanisms to support *top-down* policy implementation in fragmented sectors.

Barriers for the implementation of mitigation actions in energy end-use sectors

Due to the dispersed nature of the energy end-use sectors, stakeholders do not adopt energy efficiency (EE) technologies and practices well. Policy interventions are particularly weak in developing countries, especially in dispersed end-use energy sectors. Even if a government implements policies, stakeholders in these sectors typically do not respond well. From the business/end-user point of view, most SME and building owners and investors are unable to change their practices and update technologies due to many barriers, as follows (Hinostroza, et al. 2007, WBCSD, 2007):

Success indicators, not greenhouse gas emission reductions, should be used as the basis for the MRV of NAMAs

1. High upfront costs for energy efficiency investments.
The upfront costs associated with investment for EE technology installation or upgrade is typically regarded as a hurdle for investment. The life-cycle saving of EE and Energy Efficient Buildings (EEB) projects are often under-estimated and not properly accounted for in the investment decision process. Energy expenses are often regarded as part of business operation expenses or of building operation costs.

2. High transaction costs for technology deployment.
Due to the dispersed nature of the technologies and inadequate access to technologies and knowledge, the transaction costs for technology adoption/diffusion are exceptionally high in developing countries. Transaction costs are often NOT taken into account in lifecycle-based economic analyses. This often results in perceptions among policy-makers that the economic benefits of EE projects are high and that business owners will take up projects on their own.

3. Insufficient financing mechanisms for EE investment.
Financiers and investors of manufacturing and real estate projects often do not have sufficient information or the appropriate tools to evaluate the risk and returns from EEB and EE investment. Industrial project implementers and potential EEB investors therefore have difficulties accessing the funding through conventional financing mechanisms, which are largely based on risk analyses of investment projects. Risk assessment methods for EE investment and securitizing revenues generated through life-cycle energy saving have yet to be established.

4. Lack of awareness and inertia toward EE among stakeholders at all levels.
One of the commonest reasons for the existence of barriers is that stakeholders at all levels have insufficient knowledge about energy end-use and about how to save energy. Energy efficiency has not been a main concern for most businesses or individuals. Moreover, the practice of saving energy often interferes – and sometimes conflicts – with companies' and individuals' daily routines and tested-and-true common practices. It is also often disconnected from a company's managerial goals such as increasing production or expanding market share. This barrier creates

strong inertia that is difficult to overcome. It takes tremendous effort for most companies and individuals to change their attitudes and practices. This 'inertia' is evident in industries, designers and builders, as well as among individual energy users.

Policies and measures to overcome barriers for NAMAs

Removing key informational, institutional, social, financial and market, and technical barriers is critical to paving the way for private investment for the enormous low-cost energy-efficiency improvement and GHG emission mitigation in the building sector, as well as in SMEs.

In buildings, as indicated in Table 1, different barriers can be tackled with different policy instruments and measures. Regulatory normative instruments include appliance standards, building codes, procurement regulations, and efficiency obligations and quotas. These are the requirements that have to be met. Regulatory informative policies and measures are requirements on information provision, and detailed examples include mandatory energy auditing, utility demand-side management programs, and mandatory labeling and certification programs. Every policy measure has its own advantages, ideal target groups and specific operational mechanisms. None of them can remove all the barriers, and they need to work in packages to be effective. To improve the energy efficiency of buildings, the various barriers need to be addressed in a holistic way. Building codes and appliance standards are the most important policies and measures for energy efficiency improvement in buildings, but their success depends on effective enforcement and periodic updates (Laustsen, 2008).

In industries, minimum energy performance standards could also be implemented by industrial systems, such as steam and boiler systems, pump and fluid transport systems and other process-specific systems. Optimization of industrial systems is often more cost-effective than optimizing individual equipment (such as a boiler) alone. Implementation of performance standards in industry also need to be coupled with mandatory auditing and plant-wide energy management and accounting systems to achieve the best results. Regulatory measures such as mandatory auditing, the certification of energy consumption equipment and energy management systems, have been used in some developed countries and have proved to be effective tools to improve the efficiency of the manufacturing sector.

The dispersed nature of buildings and SME industries has been described as 'long-tail' characteristics

Table 1. Policies and measures to overcome the barriers and stimulate efficiency improvement among in building sector

Barrier category	Instrument category	Policy instruments as Remedies
Economic barriers	Regulatory-normative/ regulatory-informative	Appliance standards, building codes, energy efficiency obligations, mandatory labelling, procurement regulations, DSM programs
	Economic instruments	EPC/ESCOs (energy performance contracting/energy service companies), cooperative procurement, energy efficiency certificates
	Fiscal instruments	Taxation, public benefit charges, tax exemptions, subsidies/ rebates/grants
Hidden costs/ benefits	Regulatory-normative	Appliance standards, building codes
	Economic instruments	EPC/ ESCOs
	Support action	Public leadership programs
Market failures	Regulatory-normative/ regulatory/informative	Appliance standards, building codes, energy efficiency obligations, mandatory labelling, procurement regulations, DSM (demand side management) programs
	Economic instruments	EPC/ESCOs, cooperative procurement, energy efficiency certificates, Kyoto Flexibility mechanisms
	Fiscal instruments	Taxation, public benefit charges, tax exemptions, subsidies/ rebates/grants
	Support, information, voluntary action	Voluntary labelling, voluntary agreement, public leadership programs, awareness raising, detailed billing
Cultural/ behavioral barriers	Support, information, voluntary action	Voluntary labelling, voluntary agreement, public leadership programs, awareness raising, detailed billing
Information barriers	Support, information, voluntary action	Voluntary labelling, voluntary agreement, public leadership programs, awareness raising, detailed billing
	Regulatory/informative	mandatory labelling, procurement regulations, DSM programs, mandatory audits
Structural/ political		Public leadership programs

Source: adapted based on Koeppel and Ürge-Vorsatz, (2007)

Need-based NAMAs mechanisms with sectoral options

Policy measures to overcome the barriers to energy efficiency could be registered under an integrated NAMA framework. To support mitigation efforts in developing countries, NAMAs could be formulated as a mechanism to support the creation of an overall framework for enabling policies and the environment to overcome barriers and scale up mitigation actions in developing countries. The mechanism developed in this paper is a *need-based* mechanism, to be proposed or registered by developing countries and to follow preset rules and certain preferred policy options. The country proposals and registration of NAMAs are based on national circumstances and sustainable development needs and includes capacity-building, technology/knowledge transfer and financing in a measurable, reportable and verifiable (MRV) manner. Depending on the circumstances and needs of a specific developing nation, a NAMA should in part address overarching national climate change issues, such as the establishment of national institutional capacity and a national policy framework for climate change. Examples of such NAMAs, depending on national circumstances, could include the establishment of a national institution for climate change mitigation, the setting up of an enabling policy framework and mechanisms to scale up mitigation actions, the reduction of barriers to trade and investment, the setting up of a carbon market or energy tax scheme, etc.

NAMAs with sectoral options

NAMAs should also go down to the sectoral level to target unique opportunities in each economic sector. In other words, policy options in critical sectors for GHG mitigation need to be reviewed and considered within the framework of NAMAs. This is particularly important in energy end-use sectors where emission reduction opportunities are sector-specific, technological options are based on sectoral needs, socio-economic circumstances in each sector are unique, and stakeholder interests and capacities differ. Therefore, the requirements for capacity-building, technology transfer and financial incentives could specifically address the circumstances of the specific energy end-use sector. Moreover, because each sector's mitigation options and required international support differ, it is most effective to define sector-specific MRV methods accordingly.

Within sectors, the implementation of a set of carefully designed policy measures or a policy package is often the most effective way to spur mitigation actions and create enabling environments for scaling-up actions. A sectoral NAMA approach is especially important and could potentially create the strongest impact in dispersed energy end-use sectors, including buildings and industrial SME sectors.

In these two sectors, the implementation of minimum performance standards in conjunction with other complementary policy instruments and a market mechanism for carbon emission used for additional reduction could potentially create an integrated NAMA framework and effectively spur mitigation actions in the dispersed energy end-use sectors.

The capacity-building and technology-transfer needs of each registered NAMA could be proposed by a country as capacity-building and technology-transfer '*programs*' under the specific NAMA. In terms of sectoral NAMA, such programs can be sector-wide, or targeted at a specific action, sub-sector or region in a country.

Monitoring, Reporting and Verification (MRV)

The MRV of these programs is an integral part

of the NAMA mechanism and is strongly linked to their financing. The Kyoto Protocol uses one and only one indicator as the measure of tonnes of GHG emission reduction. This indicator may not be suitable for NAMAs. The direct emission reduction effects of enabling policies and measures are difficult to evaluate because a desired mitigation action taken by a private sector actor often does not happen only because of a specific policy or intervention. On the other hand, the impact of a specific policy or intervention does not necessarily result in emission reduction but is essential to create an enabling environment for businesses and individuals to take up mitigation activities. The attribution of causes has always been difficult when determining the additionality of a CDM project and has proved impossible in many cases. NAMAs will run into more difficulties if emission reduction again becomes the only measure of success, and MRV is entirely based on one indicator. Trying to attribute emission reductions for many mitigation activities taken by millions of 'long tail' entities to a specific NAMA intervention and MRV for them will pose exceptional difficulties for developing countries. Moreover, some policies are easier to attribute emission reduction to than others. If we only focus on measures for which it is easy to attribute emission reductions, many policies and measures that have a profound impact and create extensive co-benefits may not be considered and implemented in developing countries, such as energy audits, training, awareness-raising and research and development (R&D) programs.

Current carbon inventory and reporting mechanisms based on carbon emissions alone are insufficient to indicate the success of NAMAs

Fortunately, many indicators of success can also be measured in a quantitative manner and be used to monitor, report and verify the outcomes of each NAMA. The indicators of success and the MRV could be specific to each NAMA and each sector. The MRV methods and indicators could be determined for each NAMA, and the methodologies need to be conducive to measuring the success of policy implementation, technology transfer and capacity-building programs. However, the indicators of a specific NAMA should be determined at the UNFCCC level to enable comparison across countries using a common base. The MRV methodologies for each type of capacity-building and technology program could be established following the bottom-up and semi-top-down process similar to the development of CDM methodologies. The methodologies could therefore be adopted in common by all developing countries. The types of indicator and a possible mechanism to determine the level of financing for NAMA programs will be discussed later in this paper using the building sector as an example.

Current carbon inventory and reporting mechanisms based on carbon emissions are insufficient to indicate the success of NAMAs and NAMA programs (including capacity-building and technology transfer). Measurement and reporting needs should facilitate and reflect the outcome of policy implementation, capacity-building and technology development and transfer. Readiness to implement a registered NAMA needs to be assessed and capacity-building on MRV (e.g., data collecting, management, reporting, auditing, and use of tools and methodologies for MRV, etc.) should be carried out when necessary. Assessment and capacity-building should be subject to financial and capacity-building support from developed countries. In addition, in some countries, capacity-building for policy assessment and the formulation and registration of NAMA also need assistance and financing.

Using NAMAs to Leverage Private Sector Investment for Mitigation Actions

The illustrated NAMA concept is designed for a public-sector effort which can stimulate and facilitate additional mitigation actions from the private sector; it is essential that a majority of financing sources, at least initially, come from the public sector. The source of international funding to support developing countries' NAMA activities could also be best served by the public sector. Depending on the country's public-sector financial conditions, some countries may be able to provide partial funding from internal sources, while other countries' NAMA activities might rely entirely on the international mechanisms. In essence, the public-sector funding mechanism allocated for NAMAs could create a strong enabling environment to stimulate private-sector investment through CDM or future improved market-based mechanisms in developing countries. This mechanism is also a realization of developed countries' goals to leverage public financing for private-sector investment.

Using NAMAs in the building sector as an example

This section uses the building sector as an example to demonstrate the feasibility of the NAMA scheme described in the previous section in the post-2012 regime. Certainly, many details need to be determined at the UNFCCC level; however, the principles and the framework design features are provided to demonstrate how such a mechanism may work and how it may interface with the existing climate change mechanisms for mitigation in developing countries.

The NAMA registry

A NAMA registry in the building sector may include a policy package and various supplementary programs that are essential for the implementation for the policies:

1. Mandatory minimum performance based standards
2. Mandatory/voluntary building rating and certification programs
3. Loan, subsidies, incentives and tax breaks
4. Building auditing programs for compliance and certification
5. Building survey and monitoring programs for MRV purposes
6. Minimum performance standards for appliances and equipment
7. Building professional (including auditors') certification and education programs
8. Technology need assessment, demonstration and model house programs
9. Public-sector building improvement and high-performance building deployment programs
10. Research and development programs for new building materials, technology and practices
11. Awareness-raising and informational campaign programs

A policy package in a developing country could be registered under the NAMA registry as a building sector NAMA. Some essential items are 'required' in order to receive financing support from international funding, such as mandatory minimum performance standards, building certification and rating, and loan and subsidy programs. These policies are essential to transform the market of the building sector and need to be adopted as part of a building sector NAMA package. Countries could design their own capacity-building and technology-related programs needed to implement the registered NAMAs. Depending on needs, some countries may also receive funding to start loan and subsidy programs. Such financial assistance could also be a NAMA

'program' under the registered building sector NAMA.

Implementation of minimum energy performance standards for buildings is an integral part of the NAMA package. However, where to set the minimum performance standards largely depends on the current technical capacity and socio-economic conditions of the country. The standards could be set at an achievable level to start with and should be tightened in stages to strengthen emission reduction efforts when the compliance rate reaches a satisfactory level. To determine appropriate levels of minimum performance standards and the *step-wise* regulatory goals in various building types and climate zones, a comprehensive investigation program needs to be carried out to derive a clear picture of the current state of the building sector. The establishment of current status common baselines for MRV indicators, against which all NAMA activities could compare progress, forms the groundwork for future MRV and for the determination of future levels of standards. Some developing countries also require assistance on this front.

Capacity-building, technology transfer and financing

Once the minimum performance standards have been adopted as part of a building sector NAMA, effective implementation, the supplementary capacity-building, technology assistance and financing programs included in the package need to be supported and financed under NAMAs. Because of the dispersed nature of the building sector, the costs for capacity-building and technology assistance are expected to be high and to require financial assistance.

Some developing countries are capable of paying partial costs for implementation of the policy package, whereas others will depend on the international community to help pay for the transformations of their building sector. The proportion of national funding could be negotiated at the UNFCCC level as part of the NAMA registry and could be adjusted over time based on the financial capacity of the public sector. This is in line with the UNFCCC principle that each country's contribution to climate change mitigation should be based on its capability and national circumstances.

Interfacing with Kyoto Protocol's project-based mechanism

The implementation of mandatory minimum performance standards could interface well with current CDM and J and follow their principles for eligibility of carbon credits. The UNEP's report on CDM and buildings (Cheng, et al., 2008) suggested that using overall building performance as a main measure of success and establishing performance-based baselines as crediting benchmarks could substantially reduce the burden of project developers and effectively scale up CDM project activities in the building sector. Previous sections of this paper also highlighted the fact that the implementation of minimum energy performance standards is an effective regulatory tool to phase out low-performance buildings systematically and to gradually improve the energy performance of the entire building stock. The performance-based approach for policies and carbon crediting enables NAMAs to interface with project-based carbon-crediting mechanisms such as CDM, programmatic CDM and JI in the building sector. This approach also, by design, eliminates double counting and gives a definite and clear policy baseline for carbon crediting and the determination of additionality for CDM projects. The minimum performance standards could automatically become the benchmark for additionality and a baseline for carbon crediting (see the illustration in Figure 1). In other words,

buildings designed to go beyond the minimum performance standards will be eligible for carbon crediting. The additional energy saving, compared to the minimum performance standards as the baseline, could be translated into carbon emission reductions and apply for CDM financing in a PoA or as a stand-alone project. This framework also aligns well with CDM's additionality principle for policy compliance projects.

The performance-based building-sector NAMA framework presented in Figure 1 includes minimum performance standards and two benchmarks (crediting baselines) as a basis for carbon crediting. The higher performance building benchmarks (first line below the minimum performance standards) could be integrated with benchmarks for building rating and certification program in practice and apply to carbon credits. State-of-the-art buildings (such as zero-emission buildings and passive buildings) require a completely different set of expertise and technologies, and usually incur much higher costs in developing countries. The adoption of the most innovative building technologies and practices which exceed the benchmarks for BEE rating systems should be rewarded with premium carbon credits.

For each line or benchmarks presented in Figure 1, several subsector lines or benchmarks need to be established to represent different subsector conditions, such as commercial and residential buildings, rural and urban households, apartments and single family housing, and different climate zones. All benchmarks could be tightened over time to reflect improvements in energy performance in building stock and strengthened commitment (as seen in Figure 1, all benchmarks decline over time, which could also be in stages). The levels of crediting benchmarks of each country could be negotiated at the UNFCCC level to find a balance between a country's ambition to take responsibility and the overall global goal for emission reduction.

It is essential that a majority of financing sources, at least initially, come from the public sector

CDM as a project/program-based mechanism is effective in leveraging or attracting private-sector funding and as a mechanism to motivate private-sector emission-reduction activities and regulate them. UNEP's report on the CDM and buildings (Cheng, et al., 2008) also concluded that project/program-based CDM is an effective mechanism to support government policies and coordinate dispersed end-use activities from the bottom up, with the presence of effective policy intervention. Retaining a project/program-based mechanism (and future improvements to it) is especially important in a fragmented sector and in sectors with scattered and small emission-reduction activities, as well as in countries where most economic activities are long-tail types.

Without going into detail, industrial energy end-use sector NAMA could also be set up in a similar manner to NAMAs in the building sector. The financing framework of the industrial energy end-use is similar to the building sector framework shown in Figure 1.

NAMA Programs and their MRV in the Building Sector

As described in the previous section, capacity-building, technology assistance and fiscal incentive programs are carried out in NAMAs as 'programs'. Indicators for MRV in the building sector NAMA should be able to demonstrate changes in the building sector and the effects of various NAMA programs. The indicators should be re-

ported on a regular basis and could be used as baselines and a common denominator to evaluate the success of NAMA programs in the building sector. Additional indicators of success that could not be presented by global indicators and are critical to specific programs should be established at the program methodology level.

Examples of global indicators[2] may include:

1. Representative oraverage energy performances of buildings by pre-defined categories (according to building types and climate zones) and their estimated number/floor area (this shows the status quo of the building stock).
2. Percentage of new buildings built according to minimum energy-performance standards.
3. Percentage of existing building retrofitted according to minimum energy-performance standards for building retrofitting.
4. Percentage (number) of buildings certified or rated according to predetermined benchmarks.
1. Number (percentage) of state-of-the-art building built (zero-emission buildings and passive buildings).
2. Total amount of loans, subsidies or tax breaks issued.
3. Number of auditors on job, number of new auditors trained.
4. Number of building professionals and the percentage trained and on job

Global indicators to present the status and changes of the building sector, as listed above, could be determined at the NAMA building sector registry level. These indicators should be reported regularly. The data collection and reporting preferably follow a bottom-up process or a semi-bottom-up process using sampling and statistical principles. Methodologies for data collection, measurement and reporting for the global indicators should be established at the UNFCCC level. Methodologies for their verification should also be established.

The methodologies for building sector NAMA programs could be established following a process similar to CDM methodologies but approved at the UNFCCC level. The implementation approaches, activities and MRV methods should be included. The global indicators should be used as measures of success whenever possible and defined in NAMA program methodologies. Additional indicators could also be included based on the purpose of the programs. Building performance-related indicators, such as items 1, 2, 3, 4, 5 above, should always be used for MRV in programs.

Financing for a particular NAMA option (i.e. building sector NAMA) could be awarded at the NAMA 'program' level. The program methodologies should include criteria and evaluation methods for financing. It is also important that programs need to have long-term perspectives, plans and goals. However, they could be implemented in stages to evaluate the results of implementation and adjust the approaches. Financing could be partly *ex ante* to support the implementation of the program activities and partly *ex post* based on the improvement of indicators. The implementation results of the earlier stage could be used as criteria to determine the financing of the next stage.

2 The Sustainable Building and Construction Initiative of the United Nations Environmental Program (UNEP-SBCI) is working on a set of global indexes for building monitoring and reporting to facilitate policy development and analysis, carbon trading, and progress reporting on mitigation actions in the building sector. The published index and methodology may be used as a prototype to develop MRV for NAMAs. See http://www.unepsbci.org/

There have been concerns about trade secrets and the disclosure of privacy information for bottom-up reporting. The problem can be solved by defining the level of reporting. Only data at aggregated levels are reported. Because the methodology to derive required reporting information is transparent, the data quality could be maintained somehow. Individual data are retained at the national or local level but not required to be disclosed. Verification of reported data could follow its own independent sampling and verification methodology, so that the accuracy of measurement and reporting is double-checked.

Conclusion

In summary, the benefits of the NAMA framework illustrated in this paper include the following:

1. Because GHG reductions are not the measure of success, it avoids the double counting problem with the existing mechanisms. This eases some concerns leveled at proposals currently on the table.
2. For developed countries, the NAMA framework goes beyond offsetting mechanisms and focuses on supporting an enabling environment for mitigation actions in developing countries.
3. An MRV mechanism is embedded. Indicators are defined to measure desirable changes in the sector or to a specific NAMA measure (if not a sectoral NAMA). All activities or programs under the NAMA registry are 'MRVable' and are supported by international financing mechanisms under NAMAs. This approach could fulfill developed countries' expectation for MRV and ease the concerns of developing countries about adopting NAMA options that are difficult to measure by emission reduction credits.
4. All essential elements in the BAP 1b(ii) are addressed and include mechanisms to support activities for capacity-building, technology, financing and MRV.
5. Sectoral NAMA options to create enabling environments in sectors with dispersed GHG mitigation potentials are included.
6. Funding from developed countries for development aids for capacity-building and technology transfer in the climate change sector are integrated and implemented more systematically.
7. Public policy and funding to foster and mobilize private-sector investment through the CDM and the future project/program-based mechanism in GHG mitigation are utilized.

Some developing countries are capable of paying partial costs for implementation of the NAMAs

NAMAs are viewed as a powerful solution for climate change mitigation beyond what has been achieved under the Kyoto Protocol. To achieve the global climate target of controlling climate change of no more than two degrees centigrade above the pre-industrial level, developed countries need to make deep cuts in their emissions, while at the same time developing countries' emissions have to be significantly reduced below their business-as-usual levels. Although CDM has stimulated tens of billions of dollars of investment from the private sector toward mitigation in developing countries, the project mechanism fails to stimulate the much needed private investment

toward energy efficiency in dispersed end-use sectors. A well-designed new NAMA mechanism could provide an enabling policy framework that facilitates private-sector mitigation activities in developing countries and boosts private-sector investment in GHG mitigation in sectors and countries that are lagging behind in the Kyoto Protocol regime.

Several immediate issues surrounding the NAMA discussions need to be solved before NAMAs can be inserted as a new supporting and funding mechanism for developing countries. The issues include taking into account elements of the Bali Action Plan, avoiding double counting, interfacing with Kyoto Protocol mechanisms and leveraging sufficient private funding through public-sector investment. The NAMA framework illustrated in this paper offers feasible solutions to all these issues and has sketched out a comprehensive NAMA framework to create enabling regulatory environments in developing countries.

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BAKERY

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SECTORAL APPROACHES IN GREENHOUSE GAS MARKETS:

A viable proposition?

Abstract
Sectoral approaches have emerged as one of the new approaches that are being considered as part of a potential Copenhagen package to address climate change. While they initially emerged from industry, they are still controversial in many parts of the business community and are interpreted in different ways by business, governments and civil society. One of the uses suggested for a sectoral approach is as part of the emerging carbon market. In examining sectoral crediting and sectoral trading from a business participation point of view, sectoral trading rapidly emerges as the preferred alternative.

The year 2005 was an important moment for the emergence of sectoral approaches as a potential policy tool to address global warming. In 2005 an OECD round table was held on trans-national sectoral agreements for climate change policy, and the G8 Gleneagles Plan of Action discussed the concept. Since then, sectoral approaches have risen in prominence, with discussions in the Major Economies Forum and the Asia Pacific Partnership. They became an integral part of the post-2012 negotiations, with their inclusion in the Bali Action Plan (BAP) in 2007 as one of the enhanced mitigation actions put forward for consideration. Sectoral approaches will be an element in the negotiations at the United Nations Climate Change Conference in Copenhagen (COP 15), where it is anticipated that the political and policy framework for their future implementation will be agreed in the context of an enhanced climate change regime. The details, however, would have to be worked out after COP15.

The concept of sectoral approaches is still not clearly defined, and UNFCCC Parties, civil society and business take a very different view of what they are, how they can be organized and what roles they can play.

The emergence of the European Union Emissions Trading System (EUETS) and carbon pricing in Europe has raised serious concerns within business, especially in energy intensive industries, about potential competitive distortions. Sectoral approaches, while not well defined, were seen as a possible answer and became one of the important topics for examination. The Cement Sustainability Initiative of the World Business Council for Sustainable Development (WBCSD) has played a pioneering role in understanding sectoral approaches, their advantages and limitations.

The participation of developing countries in the climate change solution is critical, as developing countries now account for 45% of global GHG emissions.

For business, the appeal of the sectoral approach was its ability to address two critical and interrelated issues: first competitiveness and the ability of climate change regulation to impact negatively on domestic industries; and secondly the participation of developing countries in climate change solutions.

The central premise of the competitiveness issue is that, if any one country was to take unilateral action to reduce greenhouse gas (GHG) emissions, its domestic industries would be placed at a competitive disadvantage relative to countries which abstained from such actions. This could result in 'carbon leakage' and the relocation of emitting industries to countries with less stringent GHG regulations.

The originally proposed transnational sectors approach presented a logical solution to the competitiveness issue. Under this approach sectoral agreements would embrace the key participants within a global industry and would enable competitiveness concerns to be addressed directly within these agreements. However, the transnational approach has been rejected by developing countries and is not seen as a viable way forward.

Secondly the participation of developing countries in the climate change solution is critical, as developing countries now account for 45% of global GHG emissions. The ability to engage developing countries in GHG mitigation efforts has become important to many in business as the world has changed since Kyoto. The distinction between developed and developing countries in many business areas has blurred, given that powerful multinational corporations, nominally based in developing countries, have emerged since Kyoto was negotiated.

However, the principle of 'common but differentiated responsibilities' remains the cornerstone of the UNFCCC. It is recognized that developing nations do not share the same historical burden as developed nations for the current levels of GHGs. Accordingly the UNFCCC is calling on developed nations to take the lead in mitigation efforts and to provide financial and technical assistance to developing nations.

Another element that will contribute to the understanding and definition of the role of sectoral approaches in GHG markets is the experience gained so far with market mechanisms: the Clean Development Mechanism (CDM), Joint

Implementation (JI) and Emissions Trading (ET). These were defined in the Kyoto Protocol and the post-Kyoto period, largely without practical experience, and have evolved to meet the levels of mitigation ambition that were defined there. The Copenhagen Agreement will be different in all these respects.

This paper seeks to examine the new concepts that have emerged and that involve taking a sectoral approach to GHG markets, as well as to understand the viability of such an approach, especially as it relates to participation by the private sector. It starts by examining the evolution of the GHG architecture and that of the various market mechanisms, as well as how the goals and mechanisms have interacted with each other. The origins of sectoral approaches and their place with the Bali Plan of Action are discussed, as are some of the debates that are taking place around the interpretation of what is meant by sectoral approaches in the context of the UNFCCC. It goes on to examine the main points of discussion, including impacts on GHG market prices and environmental integrity, as well as other design options. The last part of the paper focuses on two options that have emerged as main contenders for the use of sectoral approaches in carbon markets: sectoral crediting and sectoral trading. In each case it looks at basic design, finance structure and incentive structure. Throughout the paper, one issue that I have tried to address is the way in which the models proposed can be deployed to pave the way towards the creation of global cap and trade system, which is regarded as the ultimate goal in the evolution of a GHG market.

The Evolution of the Global GHG Architecture

It is important to view sectoral approaches and the important role they play in the context of the evolving global architecture.

First, CDM and JI were defined in the Kyoto Protocol, with most of the detail coming not only in the Marrakesh Accords (MA), but more importantly in the decisions of the CDM Executive Board (CDM EB). While the CDM EB was conceived as a technical body, business has long argued that, given its composition and the roles that many of its members played as both members of the EB and negotiators and/or consultants, it inevitably became politicized. It can be argued that the interpretations that the EB gave to the MA and the KP led to a mechanism that fit the ambition of the targets. In other words, this was a serious attempt at reverse engineering, which succeeded.

The distinction between developed and developing countries in many business areas has blurred, given that powerful multinational corporations, nominally based in developing countries, have emerged since Kyoto was negotiated.

At Copenhagen, to meet what science tells us the targets should be radically steeper. The international community will establish the political framework and corresponding market mechanisms to meet those targets. The expectation is that in the long term this will lead to the emergence of a global cap and trade system. For example, the vision of the European Union is that by 2013 all developed nations will have a cap and

trade system in place, resulting in an OECD-wide carbon market by 2015.

A considerable amount of momentum is being directed towards this result. One critical development is the shift in political attitude in the United States. The success of the Waxman-Markey Bill in the U.S. House of Representatives has substantially increased the likelihood that the United States will have a national cap and trade program after 2012 linked to the EU ETS. Others are also in the pipeline, namely Australia and New Zealand.

To date, the role of developing countries in the global carbon markets – essentially through the demand for offsets from the EU ETS – has been limited, but encouraging. The CDM has enabled the participation of developing countries in the solution and has contributed to the build-up of critical technical and institutional expertise in these countries. But it cannot possibly deliver the supply that is expected to be required by the post-2012 demand if emission reduction targets are set according to science levels and no other mechanisms are put in place (e.g. carbon capture and storage, or nuclear energy).

The creation of global cap and trade system is regarded as the ultimate goal in the evolution of a GHG market.

The EU sees sector-based market mechanisms as the next stage in the evolution of carbon markets for developing countries, with programmatic CDM as an intermediate step, all forming a progression. It is clear that the 'classic offset mechanisms', namely CDM and JI, will remain options for developing countries, but will not be targeted at what are now called 'advanced developing countries', that is, Brazil, Russia, India and China (BRIC). These mechanisms will enable developing countries to establish the necessary domestic frameworks to facilitate the formation of domestic cap and trade systems.

Therefore, the establishment of sector-based market mechanisms is seen as a key step for developing countries towards the emergence of a global cap and trade system.

Sectoral Approaches in the Context of the Bali Action Plan

In paragraph 1(b) the BAP addresses 'enhanced national/international action on mitigation of climate change', a provision (iv) for 'cooperative sectoral approaches and sector-specific actions', in order to enhance implementation of the Convention Article 4, paragraph 1(c), addressing the commitments of all Parties with regard to sectoral cooperation, including technology transfer, which is being discussed by the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA).

It is important to note that, in the context of the negotiations leading to Copenhagen, sectoral approaches, while separated in the BAP from para 1b (ii) on Nationally Appropriate Mitigation Actions (NAMAs) by developing countries, are very much linked to NAMAs. Essentially, whether they take the form of market mechanisms or not, sectoral approaches are seen, by some, as a type of NAMA. This implies that NAMAs could be implemented through sectoral approaches.

Like NAMAs, any sectoral engagements that developing countries may wish to take are expected to be voluntary, to be supported by finance, technology and capacity-building by developed

countries, and to meet certain criteria for monitoring, reporting and verification (MRV). They will have different options for finance, but at the time of writing, there was serious opposition from developing countries to NAMAs and sectoral approaches to be used as offsets by developed countries to meet their obligations.

Should that be the case, some forms of cooperative sectoral approaches may continue to be possible, especially those that involve public money and/or are linked to technology transfer. As long as they do not produce offsets, it is unlikely that such NAMAs will attract private investment. We can expect the outcome from Copenhagen to include a serious base load of public money, on which the private sector will superimpose private money through credited NAMAs, including in the form of sectoral approaches.

It must be recognized that, at the same time, due to the lack of clarity of how the process will move forward, sectoral approaches are also currently covered under the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) as a way for Annex I Parties to achieve emission reductions cost-effectively.

Definition of sectoral approaches

There continues to be a lack of clarity on what a sectoral approach is. Discussions within UNFCCC have helped define what they are not, as well as to determine the concerns of developing countries. There are a number of issues covered under sectoral approaches, including aviation and maritime transportation, which are specific to sectors and do not imply a sectoral approach. Developing countries continue to focus sectoral approaches on Article 4, paragraph1 (c) of the Convention and link it directly with technology transfer. Article 4, paragraph1 (c) states:

Article 4 on COMMITMENTS:

1. *All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall:*

   (c) Promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in all relevant sectors, including the energy, transport, industry, agriculture, forestry and waste management sectors;

Among developed countries, the EU, New Zealand and Korea have presented specific proposals that address the introduction of market mechanisms. Japan also continues to be supportive of this approach.

Sectoral Approaches and Carbon Markets

Before entering into a discussion of the issues that need to be considered in respect of the options on sectoral approaches, as well as their advantages and disadvantages, it is important to discuss the impact of sectoral market mechanisms on the carbon market as we understand them now and see them evolving in the future.

Demand and Supply in the Carbon Market: Price and Design Options

3.1.1 Price Considerations

The GHG market is still young and in its current configuration has many variable parts. The big issue in the market for both Annex I public institutions (EC, Members States, US government, etc) and the private sector is the so-called balance between demand and supply that will ensure a price that everyone can live with, that is, that can meet their objectives.

The EU sees sector-based market mechanisms as the next stage in the evolution of carbon markets for developing countries, with programmatic CDM as an intermediate step, all forming a progression.

In the case of the private sector, for many on the emitter side of business, that is, those that have obligations, the objective is cost minimization. For those whose primary activity is carbon finance, the objective must be profit maximization, or at a minimum, if only in the short term, survival of the industry. This will require a minimum price that will allow those companies that have created the infrastructure for trading and offset project management to operate and provide a reasonable return on investment.

In the case of public authorities, as for the private sector, there could be more than one view of the world. It seems that the EU wants a high enough price to trigger changes towards a low carbon economy, especially in the energy sector. Meanwhile, the debates in the US on the Waxman Markey Bill seem to point to a desire to minimize the costs of compliance for the economy as a whole, as well as for individual installations and the final consumer.

One of the issues that is always brought up when sectoral approaches are debated is the supply that may come from sectoral market mechanisms and its effect on market balance. This may seem strange: given that the market will always reach an equilibrium, all that will differ is the price level where that equilibrium is reached.

The production of offset credits from the Kyoto mechanisms was difficult to predict at the time of the Marrakech Accords. However, as discussed, it can be claimed that the regulator, the CDM EB, with the support of the COP, has in the end created a mechanism that meets the ambitions set in the KP, thus keeping CERs at a price that kept most people happy until the recent downturn in the global economy.

The threat of the Assigned Amount Units (AAUs)1 surplus from the former Soviet bloc ('hot air') is still present and is just starting to emerge as an option for sovereign compliance.

The supply of credits from the 'classic' CDM projects can be considered relatively predictable, given that each project has to provide a forecast of the amount of offsets it will produce. This supply becomes more unpredictable with sectoral mechanisms, as the total amount that a sector will produce will be dependent on many variables, depending on the sector – temperature, price of energy, economic growth, etc.

The argument against sectoral market mecha-

1 A Kyoto Protocol unit equal to 1 metric tonne of CO2 equivalent. Each Annex I Party issues AAUs up to the level of its assigned amount, established pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol. Assigned amount units may be exchanged through emissions trading.

nisms is that they will 'destroy' the GHG market. GHG markets are invoked to help minimize the cost of addressing climate change and are not there to deliver a targeted price. If price level is the target, then a carbon tax is a much simpler and more certain delivery vehicle.

As such, we perceive this as being a serious concern only to the extent that the emission reduction targets being set for developed countries show a total lack of political courage and ambition on the part of the political class.

3.1.2 Environmental integrity

A second issue that is raised when it comes to sectoral mechanisms is that of environmental integrity. The argument is that baseline setting could become politicized, resulting in baselines that will generate credits from what would otherwise be 'business as usual'. It is a concern that must be taken seriously, but not to the point where we allow ourselves to become paralyzed. It must be treated as another technical issue that needs to be addressed, and there is a substantial body of literature dealing with it. It is not a political issue and need not become one, but it provides a good excuse for those Parties that have different agendas.

In their papers, the Organization for Economic Cooperation and Development (OECD), the Öko Institut and others have discussed the potential problems related to sectoral approaches, as well as different options to address these issues. Some of the options that are put forward in these studies are absolute emissions baselines and indexed baselines, which can be established functions of one or more indices. It is considered that developing countries will find indexed baselines more palatable, as they allow for the possibility of growth, as well as factoring in changes in the indices used.

3.1.3. Other design options

The two issues mentioned above – pricing and environmental integrity – have been raised directly in UNFCCC negotiations. There are a number of other issues that are also worth mentioning and that need to be addressed in any effort to establish sectoral market mechanisms.

The threat of the Assigned Amount Units (AAUs) surplus from the former Soviet bloc ('hot air') is still present and is just starting to emerge as an option for sovereign compliance.

They include issues such as geographical coverage (there are countries with one or more electricity grids and there are electricity grids that cross national boundaries) and definitions of sectors (sectors such as steel and chemicals have a wide range of processes and products that make it difficult to define a sector). Similarly, coverage of gases, including whether we are dealing with upstream or downstream coverage, is something that needs to be analyzed.

3.2 Definition of sectoral approaches

While there is still no consensus on the definition of 'sectoral approaches and sectoral specific action', the debate is focusing on two concepts: sectoral crediting and sectoral trading.

a. Sectoral crediting would result in emission reductions in certain sectors in a developing country from a pre-defined sectoral baseline. That baseline can be defined as an intensity target or an absolute cap. There are two different types of sectoral crediting currently under serious consideration. One is the sectoral crediting mechanism (SCM) or, as it is

In other words, this option is likely to take a top-down, one-size-fits-all approach to lowering emissions, rather than actually using the market to drive emissions reductions.

sometimes called, 'sectoral no-lose targets'. The other model relies on multi-project sectoral baselines and is often referred to as the 'sectoral CDM' model. There are clear differences between these two approaches, each with its advantages and disadvantages. However, hybrids are also possible. What unites them is the fact that the credits are, in principle, being issued post-facto.

b. The second approach that we can identify is that of sectoral trading. In this case, an allowance type instrument is issued with an ex-ante allocation that has to fall within a sectoral baseline of emissions. That baseline can be expressed in the intensity of relative terms, but absolute caps will certainly be easier to understand and accept, especially by those concerned about environmental integrity.

3.3 Sectoral Crediting

The essential difference between the two crediting models mentioned above is that in the SCM the whole sector must be under an agreed baseline, while for sectoral CDM the baseline is set at a sectoral level, but reductions are counted at the enterprise level, and only individual installations must be under the baseline.

3.3.1 Sectoral Crediting Mechanisms (SCM)/ no–lose targets.

This is the option designed to generate emissions credits where an entire sector satisfies a predetermined emissions target. The establishment of the target for a specific sector, referred to as a crediting baseline, would be determined upon assessment of both domestic and international commitments to the sector.

The determination and calculations involved in establishing a baseline are complex and the subject of their own analysis. The baseline may be measured in terms of an intensity calculation, a fixed emissions goal for the sector, or a technology penetration goal. The essential factor is that emissions credits will be granted on an *ex post* basis if the sector, as a single entity, exceeds the standard established by the crediting baseline.

Beyond this a number of options have been considered, but in this paper we will consider two with different levels of mitigation and crediting.

Option 1: Centralized Coordination of Mitigation and Crediting

Basic Design. A sectoral crediting baseline, set somewhere below a Business as Usual baseline (BAU), is agreed by the country and the Parties. The developing country government is responsible for designating or establishing a 'coordinating entity', which could be either a government or a non-governmental sectoral body, such as an association, with some government involvement.

The coordinating entity has discretion as to how the target is achieved, that is, the policy initiatives undertaken to improve sector performance, such as feed-in tariffs, minimum efficiency performance standards, etc.

No matter what policy initiatives are chosen, the coordinating entity would be responsible for determining how and if any credits achieved as a result of these initiatives would be distributed to sector participants. Distribution to installations in the sector would not be mandatory, but could be retained by a government.

Any such approach will have to assume a high level of coordination and discipline in order to reduce emissions across a wide range of disparate installations. In most jurisdictions this would make government intervention an inevitable reality. The flip side of this proposition is that the crediting will also go to a government agency which will become the holder of large pools of credits.

The same agency will largely determine how the reductions are achieved, and how many and the number of offset credits that would be available to compliance buyers from this mechanism.

From a business perspective this option faces two types of risk. The first is sovereign risk, that is, having to deal with sovereign national governments. This may translate into the government having the discipline, or will, to enforce rules and achieve reductions. Alternatively, it may choose not to fulfil agreements depending on many factors, including the going price for CERs. Enforcement options on governments, should these occur, are nowhere close to those available in enforcing private sector contractual obligations.

Secondly, it may be that the policy tools chosen, despite being fully implemented and well enforced, simply prove inadequate to meet the emission reduction goals of the sector and therefore contracted credits may fail to be delivered. However, this may be a type of risk that investors understand and mitigate or hedge against.

Finance Structure. The involvement of the private sector is more complex to understand, as well as the financing models for such an approach in general. Since sovereign risk in this case is not well understood, new risk management strategies for contracting to buy, sell and finance emission reductions may be required.

The financing under this option could be structured in several different ways. One issue is whether the covered entities, or the government, will be responsible for acquiring the financing to meet their own emission reduction objectives.

This is the simplest, most straightforward way to transmit the carbon price signal to non-covered entities in developing countries.

The second issue is whether we would look mainly at self-finance or at the need to secure other public or private-sector investors. For the latter question we assume that few installations in developing countries have the ability to self-finance such programs or to do so in a coordinated way.

If private entities will need to finance the measures, this will provide a great challenge, as it is unlikely that such a coordinated effort in a developing country will be easy to achieve.

It is therefore more likely that a large buyer, or someone that can act as an amalgamator, will have to emerge, such as a development bank or large financial institution. In addition, any such institution would have the power to deal with governments. However, this will essentially leave out smaller start-ups that have been the backbone of the industry activity so far. The same ap-

plies to cases in which governments are called on to finance these measures.

In addition, governments will need to find ways to reduce the risks inherent in financing sectoral crediting projects, such as securing a forward sale price that makes the undertaking financially attractive, thereby motivating participating entities and the government to completion.

In this instance, a developing country will have to agree to a cap on a sector or sectors, in agreement with the international community.

If covered entities are required by regulation to achieve reductions, they may be able to acquire financing via a local bank or through a government loan program. However, their ability to repay that financing is directly related to the unknown of whether or not the sector as a whole over-achieves its crediting baseline.

Where private-sector finance is needed, for either installation- or government-level activities, government-backed guarantees (likely from developed country governments) may prove essential for encouraging engagement with an SCM. Investors have become more risk-averse towards offset mechanisms as a result of engagement with the CDM, but they will need to have an appetite for much higher levels of risk under an SCM. Government guarantees could help bridge that divide.

Incentive Structure. If all of the other entities in the sector failed to make equitable emission reductions, then an individual installation would not be rewarded in proportion to its effort, and would face the risk of not being rewarded at all. Covered entities would have little incentive to lower their own emissions individually because those efforts could be wholly or partially neutralized by another installation's increasing emissions profile or inferior effort. This is why a strong coordinating entity is critical.

Smoothing the Transition to Cap-and-Trade. The probable use of command-and-control regulation under this option, even though it may prove effective in meeting the goals of any given program, generally runs contrary to the principles of a market-based system. A system whereby a target is met solely through standards and feed-in tariffs does not transmit a carbon price signal to private entities. In so doing, it does not teach them to integrate such a price into their bottom line, nor does it provide them with the flexibility to identify installation-specific, inexpensive and efficient ways to lower emissions. In other words, this option is likely to take a top-down, one-size-fits-all approach to lowering emissions, rather than actually using the market to drive emissions reductions.

Some conclusions:

- Transactions at the scale likely to be required under this design are bound to entail extensive and complicated negotiations, as well as complicated finance and risk-sharing arrangements. These arrangements threaten to slow the process of implementation and may lead to stop-and-start implementation along the way.

- Finding private-sector investors with a high risk appetite seems unlikely without publicly financed investment guarantees.

- The choice to implement wide-ranging command-and-control regulation runs the

risk of raising mitigation costs by removing flexibility and taking decisions about how to make emission reductions out of the hands of the private sector.

- Given the significant uncertainty surrounding whether or not and the extent to which the sector may over-achieve its emission reductions objective, and the all-or-nothing approach, a strong urge to regulate the supply and demand of credits is likely.

Option 2: Installation-Level Mitigation and Crediting

Basic Design. A sectoral crediting baseline, fixed somewhere below BAU, is set with the agreement of the international body responsible. The developing country government is responsible for setting an emission reduction objective for the sector and for each individual installation within the sector. The emission reduction objective is necessarily set at some point below the crediting baseline to ensure that some crediting takes place, with the difference between the baseline and the objective constituting the number of credits projected to result.

Each installation is eligible for direct crediting from the credit-issuing agency (e.g. the UNFCCC) to the extent that it over-achieves its individual emission reduction objective (i.e. its individual crediting baseline). Installations have discretion as to how they reduce their emissions, with some caveats (see 'Incentive to Act' below). They may request issuance periodically (e.g. annually) throughout the mechanism's crediting period. At the end of the crediting period, a true-up process is required in order to ensure that the sector as a whole has achieved its crediting baseline.

To the extent that crediting to individual installations has occurred without the aggregate sectoral baseline having been met, the host government is responsible for obtaining and cancelling an amount of emission reduction credits equal to the over-crediting.

Given that the basic intention in creating a sectoral crediting mechanism is to ensure aggregate emission reductions across the sector, a 'check' is required on the aggregate achievement in a case where installation-level crediting is still permitted. Requiring the host country government to hold the liability (i.e. take the risk) is a valid option, but it is likely to be resisted by some developing countries.

To allay concerns over government liability, a reserve pool, populated by a levy on credits issued to installations, could be created to cover, partially or wholly, the over-crediting that occurs. The government could also pass the liability on to the installations themselves, mandating them to achieve individual emission reduction objectives or else pay a penalty, which could be used to cover the government's obligations to obtain and cancel offset credits in the case of over-crediting at the aggregate level.

Finance Structure.

Under this option, external risk to investment will be largely minimized. Regulatory risk is less than with the CDM because there is no question of project eligibility. Sovereign/political risk is also minimal because governments are not required to approve, impose or enforce measures or plans to lower emissions.

The government will have to set the installation's objective before the start of the crediting period, but this move will take place before emission reduction plans are made and contracts signed,

so it will not factor into investment risk. There is some concern that in a number of developing countries the larger industries are state-owned, suggesting that there could be an incentive to set 'weak' objectives.

Financing under this option would closely resemble typical project finance, even more so than with project-based CDM. Installations in the host country could sign Emission Reduction Purchase Agreements (ERPAs) with compliance buyers or offset aggregators, using them to boost the attractiveness of the project and help secure finance for their emission reduction activities. In fact, because of the low regulatory risk, ERPAs may even prove able to drive financing decisions under this mechanism.

Installation-level reductions will be on such a manageable scale that they can be monitored by investors and compliance buyers if desired, thus reducing the perceived risks of investment and non-delivery. A relatively small group of investors or a domestic bank could prove sufficient to obtain the capital required in most cases.

Incentive Structure. Under this option, individual installations face a direct, positive incentive to lower emissions as long as their own cost of reducing emissions is less than the price of carbon. This is the simplest, most straightforward way to transmit the carbon price signal to non-covered entities in developing countries.

The fact that the government is liable for any failure to meet the sectoral reduction target in the event that some crediting takes place provides it with an incentive to become more active in the sector's efforts to reduce emissions.

Smoothing the Transition to Cap-and-Trade. By providing a direct, positive incentive to private-sector entities, this option transmits a carbon price signal directly to the installations, leading them to internalize the price of carbon into their bottom line. In so doing, it prepares those entities for the transition to an economy-wide cap-and-trade system, in which carbon price internalization will be the key to meeting their emission reduction obligations at the lowest cost. Governments will also help pave the way by developing the infrastructure and capacity required to use this option.

3.3.2 Sectoral CDM.

This is a tool that business likes for a number of reasons. It is simple and straightforward, with clarity regarding who the projects participants are, where the private investor intervenes, and the relatively limited role for the government in reaching the reduction targets and monetizing the reductions. It largely eliminates subjectivity on the issue of additionality by establishing a sectoral baseline.

Guidelines for how baselines will be set up will have to be agreed at the international level, and different options have been presented under whose jurisdiction this will be done: the CDM Executive Board (EB), the COP, or another agency. Unless and until such a time when the whole GHG market mechanisms regulatory machine is run from an independent agency, the task of defining international guidelines should stay with the only institutions that have a mandate, the CDM EB and the UNFCCC Secretariat.

However, the practical implementation, data collection, etc. should be allocated to different regional institutions that have the necessary capacity and are seen as impartial, such as the Asian Development Bank, the Inter American Development Bank, the African Development Bank, etc.

3.4 Sectoral Trading

In this instance, a developing country will have to agree to a cap on a sector or sectors, in agreement with the international community. Countries will have to adopt allocation systems that should be national prerogatives. It is clear that all the elements related to the MRV of emissions are components of the Emissions Trading System (ETS) that will be critical. Different types of NAMAs will require different levels of MRV, but a sectoral trading NAMA will require a sophisticated MRV system.

In the case of sectoral trading in a developing country, an auctioning system is less likely to be put in place. While the type of allocation will determine primarily the economic efficiency of distributing allowances, auctioning will impose additional costs on that sector. Should that be a globalized sector, such an approach is likely to be resisted by industry and the government of such jurisdiction. However, it is likely to be seen in a very positive light by business in developed countries. Some other type of allocation, grandfathering or benchmarking, is more likely to emerge as the preferred alternative in the early stages. Individual installations will have their own allocation.

In this case, the allowances allocated would be fully fungible with Assigned Amount Units (AAUs) for the purpose of accounting, and they would be good for compliance at the sovereign level. Different domestic emissions trading systems will have to make their own decisions whether to accept these units for compliance under domestic emissions trading systems.

The advantage in the case of sectoral trading is the fact that units are issued ex-ante and can be traded under standardized contracts, as opposed to primary Certified Emission Reductions (CERs). This will also result in exchange-based trading for developing countries. This eases trading, as exchanges will help to address many of the issues dealing with 'know your customer' legislation, which has become common place in OECD countries but is difficult to put into practice in relationships with counterparties in developing countries. This would also start creating the infrastructure and capacity-building for a global cap and trade system, making the future transition much easier.

This is a tool that business likes for a number of reasons

Another element that needs to be taken into account in order to make the system credible is the risk of non-compliance for the sector and any penalties that may ensue. After all, allowances from that system would have been sold to buyers outside the system, and they cannot be called back without the risk of unravelling the whole international emissions trading system.

For the market to believe in this, a system other than penalties should be envisaged and a reserve of some sort should be put in place: something like a commitment period reserve could be put in place allowing only a certain number of allowances to flow outside a sectoral trading system. National government liability in the international arena for non-compliance is an alternative solution.

In this case, benefits will devolve to enterprises as they make reductions. Governments will also be tempted to grab some of the revenues, and the simple way to do so will be to auction some of the allowances and establish an insurance scheme to address non-compliance at the national level.

Conclusions

The carbon market is at an intermediate stage in terms of development, but with little doubt about the role that it will play in the future. CDM and JI have proved better than many had expected, but they cannot possibly meet the deep emission reductions expected for the post-2012 period. At the same time, we must remember that offset mechanisms have always been seen as a transitional phase to a full global cap-and-trade system. Sectoral approaches could address many of the issues identified, but they could also create serious drawbacks, especially in relation to the role that private finance will play.

We must remember that carbon markets were created to unleash the entrepreneurial spirit of the business community and provide a clear market signal that will change behaviour and influence economic choices. They were also created to make sure that private funds, which were seen as essential to finance the transformation to a low carbon economy, could be tapped. If the private sector is somehow shut out, then one of the important criteria for success will not have been met. If we are not careful, we will end up with a government-to-government solution.

CDM and JI have proved better than many had expected, but they cannot possibly meet the deep emission reductions expected for the post-2012 period.

Sectoral approaches are not perfect. Any problems must simply be recognized, and addressed, as is done in every other field of human activity. The challenge is grave and will not be dealt with by being paralyzed in search of perfection or by being afraid of compromises. From a business perspective, we need to welcome new approaches that will allow for a more efficient and effective production of offsets. This will help business meet the obligations that society will place upon it at a cost that will free resources for other priorities.

While governments have a key role to play in sectoral approaches, it is far from clear how business can participate in a realistic way. CDM has succeeded better than expected because of the entrepreneurial spirit it has unleashed, which has countered many of the conservative instincts of COP and the regulator. CDM has thrived on adversity. Unless business can drive sectoral work within the framework created by governments it is unlikely to succeed, in spite of the great promise it holds out.

Sectoral crediting poses a number of challenges, but it will be certainly tried. Based on the discussion above it, may meet the criteria for success in a limited way and may be less attractive to the private sector. It will be attractive to negotiators as it does not impose absolute hard caps on developing countries, making it a more palatable solution.

While more challenging to include in a Copenhagen agreement as an option for those who wish to take it, sectoral trading presents many advantages. The challenge comes from the fact that sectoral trading needs a hard cap, which developing countries will be reluctant to embrace. On the positive side, it would create a commodity, allocated ex-ante, and eliminate the whole uncertainty associated with project mechanisms, additionality, etc. It will also send a clear market signal to those who have to take action, namely enterprises.

What it may come to is a hybrid approach, through the use of that often quoted but ill-defined concept, the public-private partnership. Something is needed that looks like a 'no-lose sectoral target' for a developing country and a hard cap from the perspective of the global architecture. This amounts to having one's cake and eating it too.

A developing country may take a sectoral no-lose target and allocate allowances to the enterprises covered, which can then trade them inside their domestic ETS, or outside, if linked to other ETS, such as the EU ETS. However, there is a risk that the cap will not be met, thus putting at risk the environmental integrity of the whole approach.

In order to ensure the hard cap, someone has to take the sovereign risk for environmental delivery. As developing countries will likely resist that since they accepted a no-lose target, this risk could be carried by an international financial institution, such as the Global Environmental Facility, which is the financial instrument of the Convention. Clearly any such institution will have to have the means to ascertain that all efforts have been undertaken to meet the cap. Other instruments, such as a pool approach, a reserve or insurance scheme could help meet the same objective. It is most likely that all these instruments will finally come to co-exist in the initial phase. In the market place of ideas for market approaches, they will all either find their niche or simply fade away and be remembered as an interesting experiment.

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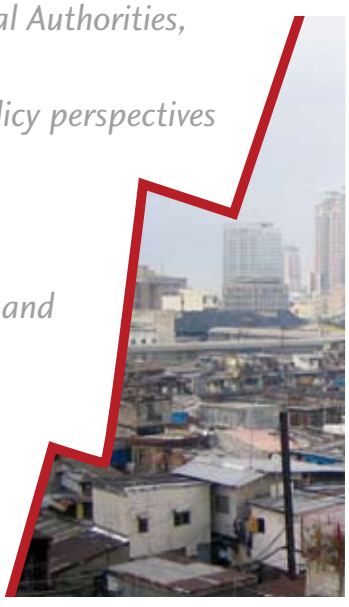
The annual CD4CDM Perspectives Series features a topic of pivotal importance to the global carbon market. The series seeks to communicate the diverse insights and visions of leading actors in the carbon market to better inform the decisions of professionals and policymakers in developing countries. The third theme of the series explores how mitigation actions in developing countries in the context of sustainable development may be supported by technology, financing and capacity development in a measurable, reportable and verifiable manner. Eight authors with a background as negotiators representing developing countries, Designated National Authorities, business and researchers cover two overall issues: national and policy perspectives and the carbon market for sectors including sector approaches in transport, buildings and industry. The aim is to present new ideas and solutions with a focus on the role of existing and emerging carbon markets to finance nationally appropriate mitigation actions in developing countries.



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